

Martin Borbone. From doodle to Google: Exacerbating old problems or causing new ones? The relationship between laptop usage and in-class student behavior. A Master's Paper for the M.S. in I.S degree. April 2009. 93 pages. Advisor: Deborah Barreau.

This study describes a survey of undergraduate and postgraduate students currently enrolled in the School of Information and Library Science at the University of North Carolina at Chapel Hill during the Spring semester 2009. The study investigates in-class laptop usage by students and what laptop activities students engage in during class.

The study examines student perceptions towards their own laptop usage and if such usage distracts, annoys, or bothers other students, and explores student perceptions as to how they may be distracted by such behaviors in class.

The study also examines varying degrees of laptop restrictions in class and how this affects student involvement with a class and the predisposition to participate in an elective course if they knew in advance that such restrictions were to be imposed.

#### Headings:

Student attitudes

Student behavior

Multitasking in class

Classroom environment

Classroom research

Laptops in classrooms

IT in education

FROM DOODLE TO GOOGLE: EXACERBATING OLD PROBLEMS OR CAUSING  
NEW ONES? THE RELATIONSHIP BETWEEN LAPTOP USAGE AND IN-CLASS  
STUDENT BEHAVIOR.

by  
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## INTRODUCTION

Concluding the opening remarks of her weekly lecture Professor Jones espied one of her more promising students, a young woman who always sat in the center of the second row, engaging in activity that troubled her.

“Miss Smith, what are you doing with that deck of cards?” asked Professor Jones.

“Playing solitaire!” replied Miss Smith.

“Why?” exclaimed the Professor.

“Because my laptop is broken,” came back the retort.

While this account is fictitious, there is more than a kernel of truth in the above scenario. Student classroom behavior with respect to computers is the subject of much research in light of the fact that “laptops are the latest in a series of technologies that are revolutionizing classroom teaching” (Granberg and Witte, 2005). However, this corpus of knowledge focuses primarily on the use of computers<sup>1</sup> as classroom teaching aids (Barak, Lipson and Lerman, 2006; Bates, 2009; Bhave, 2002; Yamamoto, 2008) and the perceptions of instructors as to the practicality and value of computers as part of the classroom environment (Arend, 2004; Anderson, 2008; Bhave, 2002; Demb, Erickson, and Hawkins-Wilding 2004; Foster 2008). There is a dearth of research with respect to student perceptions and behaviors towards their personal use of laptops in class, the use of laptops by other students, and whether such activity disturbs students to the extent that it reduces their inaction and involvement with a class (Elwood, Chuleeporn, & Cutshall,

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<sup>1</sup> For the purposes of this paper, computer is interchangeable with laptop, as in laptop computer, Personal Digital Assistants (PDA's), Blackberries, cell phones, and other portable electronic devices.

2006; Fried, 2008). Indeed, in a 2002 University of North Carolina at Chapel Hill, School of Information and Library Science survey by Li and Newby, students expressed concerns with respect to classroom laptop usage. One student states, “People will check their email or play games in class instead of paying attention, annoying the rest of us with their typing.” Another student cautions that “right now we have great discussions in some classes, but if we all have our attention directed at our laptops we will be losing a lot of the interpersonal communication and class participation” (Li & Newby, 2002). Yet little additional research appears to have evolved from this study as to the potential benefits or pitfalls of in-class laptop usage from the student’s perspective, which begs the question *why?* This question is beyond the scope of the current research yet raises another avenue of exploration. Do students consider laptops a ‘must have’ tool or a “Trojan horse” that brings into the classroom new distractions not only for the student operating the laptop but also for those around them?

This paper analyzes the findings of a research study that looked into laptop usage and in-class student behavior in the spring semester 2009. To begin, the paper provides a contextual framework in which the research was conceived and outlines the purpose of the study. Following this is a review of the extant literature providing background and insight into the early adoption of laptop technology and the later issues surrounding wireless networking when combined with unfettered in-class laptop usage. Next is the research methodology highlighting participant selection criteria, participant involvement, data collection, and data analysis. This leads to the results of the study, a discussion of the findings, and lastly, some concluding remarks and thoughts for future research.

### ***Framing the Issue***

*As part of the university's coordinated technology plan, the Carolina Computing Initiative (CCI) aims to ensure that Carolina students, faculty, and staff have easy access to high quality and affordable technology and can use it effectively. At the center of the initiative is the requirement that, beginning with incoming freshmen in the fall of 2000, undergraduates at the University of North Carolina at Chapel Hill own laptop computers that meet University specifications (Our Mission, 2007).*

Wireless networking of the UNC campus opened up many new avenues for educational instruction, providing a richer context to traditional classroom materials through collaboration and knowledge discovery. The successful introduction of the Carolina Computing Initiative (CCI) eight years ago foreshadowed the exponential growth in online educational services to complement conventional pedagogies. Technological advances, such as wireless networking, have significantly changed the classroom environment and the instructor/student paradigm (Arend, 2004; Fried, 2008; Yamamoto, 2008). However, the combination of increased laptop usage with unfettered accessibility to the Internet offered new opportunities for student distraction, both individually and collectively (Bugeja, 2007; Foster, 2008; Terry, 2008; Yamamoto, 2008). However, there are those such as Yamamoto (2008) who argues that computers are not the real villain. Doodling or a crossword puzzle can be just as distracting, though in less obvious ways. Boredom is likely one of the main culprits and idle minds have always found innovative ways to occupy themselves. For some, laptops offer the modern equivalent of doodling.

The advent of laptop computers and wireless networking provided opportunities to enrich the learning experience enabling students to verify facts, link to resources for additional information, and access online course materials (Barkhuus, 2005; Elwood, Chuleeporn, and Cutshall, 2006; Granberg and Witte, 2005). Yet laptops have the potential to create new in-class distractions including web browsing, instant and text

messaging with friends, online Scrabble™, crosswords, and a myriad of other services unrelated to classroom activities (Anderson, 2008; Barak, Lipson, and Lerman, 2006; Yamamoto, 2008). From the fervent tapping of the keyboard to the pulsating aural and visual alerts when Instant Messages arrive, computers demand attention not only from those using them but also from those in the immediate vicinity who, rightly or wrongly, are distracted by such enterprises. ‘Doodling’ on a scratch pad or drawing stick figures on the surface of a desk are solitary activities often associated with daydreaming and therefore may go unnoticed by other students. However, the visual and aural qualities of laptops have the potential to intrude or disrupt the personal space of those in the surrounding environment (Bhave, 2002; Granberg and Witte, 2005). Yamamoto (2008) notes that, “a crossword puzzle and doodling are done on a horizontal surface, not lit and in glowing color, and will not distract (most likely) those behind, or even possibly the person next to them.” Laptops, and similar devices, require active participation by their users. Unlike the doodling of daydreamers, “browsing, playing computer games, exchanging email and Instant Messaging,” (Bhave, 2002) synonymous with the Internet age, potentially results in passive participation by students in the immediate vicinity, curious to see what another student is looking at on screen (Bhave, 2002; Granberg and Witte, 2005; Yamamoto, 2008). This in turn is likely to create a distraction, or what I term a *residual* or *over-flow* effect<sup>2</sup>, that may be fleeting or more prolonged. “Since laptop screens are vertical, students sitting in line-of-sight of the offending screen are distracted. One person in the front row can distract almost the entire class if the screen is

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<sup>2</sup> In this instance, the term *residual* implies something leftover by the active party that consciously interferes with a passive third party, or where the enterprise of the active party *over-flows* involuntarily to the passive third party, such that the third party participates of the enterprise temporarily or for longer periods.



large, and what is being viewed is provocative,” asserts Yamamoto (2008). What remains unclear is under what circumstances is a student distracted by another student’s laptop activity, how often does this happen, and what effects, if any, does this have on the classroom experience of the distracted student.

## **PURPOSE OF THE STUDY**

This study seeks to address student behavioral issues with respect to the use of laptops, including Personal Digital Assistants (PDA’s), and other similar devices during classroom instruction sessions. Specifically, the study focuses on the student behavior of bachelor and master degree majors enrolled full-time in one of the School of Information and Library Science’s (SILS) programs at the University of North Carolina at Chapel Hill during the spring semester, 2009.

Previous studies in the area of in-class student interaction with computers take a position from the vantage of the instructor’s standpoint (Owen, 2006), with less understanding or analysis for how and why students use laptops in class. Where students feel engaged in the classroom experience and subject matter, does laptop usage increase or decrease? In what other contexts do students use their laptops during class, for what curricula and non-curricula purposes, and most importantly, in what ways do students believe such usage enhances or diminishes their educational experiences? How might students react to the potential curtailment of classroom internet accessibility to context-specific environments (Barreau, Crystal, Greenberg, Sharma, Conway, Oberlin, Shoffner, & Seiberling, 2007; Conway, Shoffner, Moffat, and Oberlin, n.d.) or the outright banning of laptops (Anderson, 2008; Jaschik, 2008; Mangan, 2001; McGlynn 2008; Yamamoto, 2008; Young, 2006), unless specifically required by an instructor? In the event that

instructors could restrict internet access to specific class websites (context-aware classrooms) or disable the wireless network during a given class period, would students avoid taking such classes specifically due to such restrictions?

## **REVIEW OF THE LITERATURE**

Numerous studies and reports address the use of laptop technology both within and beyond the traditional classroom setting (Fried, 2008; Lecher, 2005; Levine 2002a; Levine, 2002b; McGlynn, 2008, Owen, 2006). Many studies focus specifically on professorial perceptions of use and abuse of laptops during class instructional periods (Arend, 2004; Barak, Lipson, and Lerman, 2006; Granberg and Witte, 2005; Fried, 2008; Hembrooke and Gay, 2003), times when students should be using computer technology in furtherance of their education. Less well served by the current literature is the student perspective of laptop usage and under what conditions students feel sufficiently distracted that they resort to using their laptops as a means to disengage temporarily or completely from the educational process (Arend, 2004; Demb, Erickson, and Hawkins-Wilding, 2004; Lloyd, Dean, and Cooper, 2007). Before resorting to draconian measures, for example banning of laptops from classrooms, we must first acknowledge if a residual or over-flow effect exists, how this manifests itself, and what ramifications, if any, this has on other students (Borja, 2006; Foster, 2008; Hembrooke and Gay, 2003; Ribble and Bailey, 2004; Ribble, Bailey, and Ross, 2004; Young, 2006). In turn, this raises the broader question – are laptops within classrooms aiding or hindering the diffusion of information between instructor and student.

In 1998, Michael Hooker, Chancellor, University of North Carolina at Chapel Hill (UNC) stated, “My goal is to put a computer on the desk of every faculty, staff, and student” (Carolina Computing Initiative, 1998). Hooker’s vision was realized in Fall 2000, when laptops became mandatory for all incoming freshmen (Li and Newby, 2002). In 2001, all entering graduate students at the university’s School of Information and Library Science were expected to have laptops, purchased directly or via UNC through the Carolina Computing Initiative. At the time, UNC was the largest public university with a mandatory laptop requirement (Li and Newby 2002) and a, “decision to require students to own a laptop is not unusual among higher education institutions” (Elwood et al., 2006). Many other institutions, both public and private have followed suit with similar initiatives.

*Students will have so many options for learning that traditional formats, void of much technology, will have little to offer in the marketplace of the next century. I believe the clock is ticking for higher education, and it may be a wired bomb unless we act fast to take advantage of the opportunities, and avoid the threats, of a fully digital, networked, multimedia world. -- Thomas W. West, Associate Vice Chancellor for IT, California State University System Office.*

*Source:* <http://www.unc.edu/faculty/faccoun/minutes/CCIM98FC02.pdf>

To be sure as West predicted, “technology-infused teaching” (Ribble and Bailey, 2004) has become the de facto standard within higher education. The raison d’être behind the Carolina Computing Initiative was to create a comprehensive laptop policy that allowed for the “integration of technology into the curriculum with the confidence that students had the equipment required to access it.” However, a study of students by Cutshall, Changchit, and Elwood (2006) found that while many “... may see the benefits of using laptop computers in their education, they [students] do not believe that it [laptop] should be a requirement.” Indeed, Demb et al. (2004) found that, “Student perception of the

value of the laptop to their academic success was tightly correlated with their perception of the success of faculty in integrating the laptop into teaching and classroom activity.” In that respect students regarded laptop purchases as an added expense to an already expensive service, that of education, where cost is “deemed a critical success factor” in implementation and the subsequent take-up rate of a laptop program.

In recent years relatively inexpensive and lightweight laptops have entered the market, and professors can “reasonably require” (Granberg and Witte, 2005) students to bring them to class. Not surprisingly however, research points to the availability of on-campus wireless network access as the most important factor in the success of a laptop initiative (Cutshall et al., 2006) and a major reason why students bring laptops to class, even when not required.

As compulsory programs were established in the mid to late 1990’s, many studies suggested a generally positive response to the introduction of laptops. Barack et al. (2006), quoting previous studies, refers to the overall increase in “students’ motivation and collaboration, strengthened connections between disciplines, improving students’ problem solving skills, and promoting academic achievement,” with respect to laptop usage in class. Others, including Lloyd, Dean, and Cooper (2007) and Demb et al. (2004) state that, “as students become more accessible to each other, and as faculty become more accessible to students, a laptop strategy could be viewed as a means to further develop a sense of community on a campus or in specific classes.” Bhave (2002) supports this sense of community going further by saying, “the normal ‘one-to-many’ method of any teacher will now be augmented and overlaid by numerous one-to-many electronic conversations, messages and alerts from the outside.” Yet a community traditionally involves ‘many-to-

many' relationships and a study by Anderson (2008) suggests that students view classroom interactions as a "bunch of 'parallel bilateral' relationships between teacher and student, not a multilateral set of relationships in class." Such multilateral relationships are evident in the outside world where social-networking sites such as MySpace and Facebook have quickly interweaved into the societal fabric of the new economy increasing communication and learning in non-traditional ways.

Wake Forest University, which has had a laptop initiative since 1997, reported that students with computer access, "led to better communication and collaboration, which in turn has enhanced teaching and learning" (Olsen, 2001). Similar studies corroborate the Wake Forest University findings. A two-year study aimed at middle school students in Beaufort County, S.C. found that the "use of laptops as electronic notebooks is associated with sustained levels of academic achievement over time." Evidence suggests that the "use of laptop computers as notebooks is associated with sustaining and improving academic achievement among groups of students who historically have not been as successful in school" (Stevenson, 1999). However, not all studies support such findings and indeed, with the advent of wireless networking and the ability to access the internet through a myriad of different devices, recent studies are questioning the wisdom of laptop usage within the classroom setting.

*First, the lack of eye contact itself means a key indicator of student engagement and understanding is missing. Second, a student looking at a laptop screen and concentrating on solitaire looks identical to a student concentrating on the material for the day. This means a professor lacks the capacity to control students' attention level and the flow of analysis in his or her classroom (Yamamoto, 2008).*

The ubiquitous nature of computing is related to and became available due to wireless technologies. Granberg and Witte (2005) state that, "harnessing the fullest

potential for laptop teaching required the availability of the second technology, wireless Internet access.” With many institutions providing wireless networking, universities are offering students new ways to learn via electronic discussion boards such as Blackboard and WebCT and enabling “in-class on-line interactions between teachers and students” (Barkhuus, 2005). To be sure, some already argue that wireless laptops, PDA’s and PIM devices are changing the educational environment (Anderson, 2008; Barak et al., 2006; Brubaker, 2006).

Such an evolutionary progression towards laptop computing potentially belies a greater concern that the technology is disrupting the very essence of the classroom environment. Indeed, in recent years concerns have been expressed by a growing number of academics as to the value and use of laptops within the classroom. Quoting Dennis Adams, writing in the September 2006 issue of *Communications of the ACM*, Bugeja (2007) attributes the following: “While classroom access to the Internet may be a wonderful teaching tool it can also be a barrier to learning.” Such barriers are both physical and cognitive. Physical in the sense that the nature of most laptops requires the raising of a screen behind which a student can hide and furtively surf the web, and cognitive in the sense that any activity not directly related to the current class is distracting both for the student and for those within his or her immediate vicinity. Indeed, Barak et al. (2006) note how laptops unintentionally provide students’ with “opportunities for non-learning usages and limit or even reverse benefits when measured in terms of academic performance.” Foster (2008) similarly argues that if you allow students’ unfettered use of laptops in-class they will “surf the web instead of engaging in class, and play games, shop online, or e-mail friends, distracting themselves and those

who sit near them.” Some students unwittingly make such nefarious activities obvious by hiding behind their laptop screens nestled way in the back rows where they think they are unseen by a professor.

Others take a different view arguing that “unlike whispering or passing paper notes, students can non-disruptively communicate with each other through the access point [laptop], as well as in a peer-to-peer manner” (Bhave, 2002). Indeed, some professors advocate the use of laptops during class where they feel the technology “aids in the educational process” (Yamamoto, 2008). Additionally, there are those who contend that wireless networks and laptops allow students to “communicate silently with their peers” (Granberg and Witte, 2005) without disrupting them. Yamamoto (2008) contends that, “Instant Messaging (IM) by students during class is also seen as positive. Some professors believe it keeps the room quieter because students can IM each other instead of talking.” However, such arguments fail to take into account the clandestine nature of many of these ‘conversations’ and the distraction that keyboard tapping can cause other students. This suggests that a “key challenge in leveraging technologies to support innovative teaching and learning, is to determine how to design curricula that effectively integrate technology in a coherent and authentic way” (Barak et al., 2006). As Granberg and Witte (2005) contend, “the aim is to use technology to channel these normal classroom behaviors... sideways glances, knowing looks, and discrete whispers... in a way that would be more efficient and less disruptive.” Such challenges suggest a wider issue concerning the integration of laptops within the learning environment and how actively involved are students. Barak et al. (2006) go further and suggest that, “integrating active learning strategies as part of the formal learning sessions can advance

students learning as well as address the concerns of instructional change.” These challenges also highlight how technology hitherto embraced and adopted as an innovative education tool, is creating unforeseen issues that need addressing (Foster, 2008). As Anderson (2008) argues,

*Internet access has done more to lower attention and thought in the classroom that anything I am aware of – having a TV, blackberry, IM machine, email device and web surfer is simply an impossible distraction.*

Citing a 1972 article by Eda LeShan, Bugeja (2007) refers to the “Sesame Street syndrome” in which children are the passive onlookers within the information chain, waiting on adults to feed them the answer. Latterly, this syndrome has come to denote the interactivity and entertainment of a given class where “if the entertainment doesn’t come from the front of the wireless classroom, it comes from the Internet” (Bugeja, 2007). While this may be the case, much depends on whether laptops are a requirement for a given class and the attitude of the professor towards laptop usage in class generally. As Barak et al. (2006) state,

*A key challenge in leveraging technologies to support innovative teaching and learning is to determine how to design curricula that effectively integrate technology in a coherent and authentic way.*

While the issue of how to successfully integrate technology into the classroom environment is ongoing, there has recently been a growing backlash towards laptops generally within classrooms (Bugeja, 2007; McWilliams, 2005) and a move towards more draconian measures aimed at curbing Internet usage or banning laptops outright. One solution is to have students log into a particular class as part of a subscription management system, where the professor preordains accessibility to specific services while other services remain blocked. However, student ingenuity to swap usernames and passwords is likely to undermine any such attempts. Others argue for an Internet “kill



switch” (Anderson, 2008; Bhavé, 2002; Mangan, 2001) which effectively gives the professor the control as to when to enable and disable the Internet during class. When attention needs focusing towards the front of the classroom the Internet is disabled and students asked to lower their laptop screens (Granberg and Witte, 2005; Levine, 2002a). At other times, the Internet is enabled for research, project work, tests, etc. However, bleed-through from other wireless networks together with mobile communication devices such as smart-phones and PDA’s have already “rendered the classroom permeable to outside interruptions” (Bhavé, 2002). Faculty at UCLA’s Anderson School of Management concluded that “stopping the [wireless] signals amounted to a technology arms race that couldn’t be won” (McWilliams, 2005), and subsequently gave up trying.

Such interruptions may be mitigated to an extent, by providing “context-aware classrooms” (Barreau, Crystal, Greenberg, Sharma, Conway, Oberlin, Shoffner, 2007; Conway, Schultz, Shoffner, Moffat, and Oberlin, n.d.; Yang, 2006). In a context-aware environment the student is “recognized and assigned various services based on their prior needs and requirements which together seamlessly integrates the computing and communication devices into a physical environment” (Wang, 2006). Other solutions take a *show-and-shame* approach. The use of “RFID’s (Radio Frequency Identifiers), mobile sensors, and device controllers” (Wang, 2006) enables the professor to monitor in-class network usage, capture the contents on an individual student’s screen, and project this for the class to see (Mangan, 2001). Although Owen, Farsaii, Knezek, and Christensen, (2006) note how the Internet has changed the “locus of control from the teacher to the student when the students were given laptops of their own,” such technical solutions, together with greater incorporation of laptops into the curricula, may redress the

imbalance of power that some professors perceive. Technical solutions may also improve student attention and interaction within the classroom generally, though as Fried explains, “unstructured use of laptops in lecture courses is a disadvantage,” both to the student and professor. Of course, there are arguments on the other side as well, and some evidence that some students actually prefer lecture to being required to participate.

Banning laptops from the classroom is the most draconian of measures though may be the only viable solution in some circumstances. Indeed, a number of studies show that bans, although unpopular with students at first (Foster, 2008), have shown attention levels to increase by a factor of 200% or more. “Students are more engaged and talkative in class and show an increased ability to reason” (Yamamoto, 2008). In-class test results between those who used their laptops versus those who did not revealed an average 5% variance in results favoring those students who did not use their laptops (Pinchin, 2009).

This suggests a correlation between laptop usage and recall of information. Hembrooke and Gay (2003) note that, “students in an open laptop condition suffered decrements on traditional measures of memory for lecture content,” and that despite this decrement in recall students are not only happy to multitask, but also continue to do so in ever-increasing numbers. Yet, as Hembrooke and Gay (2003) contend there is a “long tradition of psychological and media communication research that indicates that our ability to engage in simultaneous tasks is, at best, limited and at worst, virtually impossible.” While that might be the case, students nevertheless continue to multitask with impunity, which suggests that some form of laptop restriction may be an appropriate response.

An anonymous survey of students taken after a one-day laptop ban suggested that 75% of students favored a no-laptop policy while 95% of students acknowledged using their laptops for non-class activities at other times (Foster, 2008). Another approach is to inform students from the outset that if they are found to be using their laptops for anything other than recognized class work, e.g. email they will lose the privilege to use their laptop in class for the rest of the semester (Terry, 2008).

This raises the issue of attitudes and expectations between faculty on the one hand and students on the other. Cutshall et al. (2006) argue that the “success of computer use is largely dependent upon the attitudes of both instructors and students,” while Barkhuus (2005) points out that, “unless the teacher specifically prohibits the use of laptops in the classroom, the wireless networks will inevitably provide a source of distraction for students who bring their devices to class.” Foster (2008), quoting Ann Althouse, a professor at the University of Wisconsin Law School says, “there will always be distracted students regardless of the Internet. Before the Internet, students gazed out of the windows, doodled or simply fidgeted.” That may be the case, but the advent of laptops and wireless networks are clearly providing new avenues down which students can be distracted. All of which suggests that laptops are not being fully integrated as part of the education experience and that students are taking the opportunity afforded by the technology to multitask or completely ‘zone-out’ from the lecture.

In a study by Demb et al. (2003), 51% of students “*disagreed* that faculty demonstrated how the laptops could enrich the [learning] experience,” a thought echoed by Fried (2008) who contends that in the “rush to adopt laptops as the tool-du-jour in higher education, research on the impact of laptops on learning has been neglected.” As

Granberg and Witte (2005) remark, “making laptops and wireless networks widely available does not necessarily improve student learning,” a marked departure from earlier studies that support such programs. Some suggest that distracted students really are not missing much of long-term value. This view is reflected in the comments of Demb et al. (2007) who contend that there is a “perception by colleges that technology will have a positive impact on student learning,” without explicitly detailing what these benefits might be. Conversely, the findings of Fried’s (2008) study at Winona State University in Minnesota (2007) suggest that those students who used laptops in class did so for an average of 48.7% of the time. Of this “81% checked email, 68% used Instant Messaging, 43% surfed the web, 25% reported playing games, and 35% reported doing “other” things” (Fried, 2008). Overall, 17 minutes out of each 75-minute class period was used in whole or part to non-class activities. Others report that in some classes “85-90% of students are doing non-class activities on their computers during class” (Yamamoto, 2008).

The Wharton School at the University of Pennsylvania is out of step with the mainstream institutional approach to laptops and wireless networks. Mangan (2001), quoting Gerry McCartney, associate dean for computing and technology, states, “we never wanted technology to get in the way of the relationship between the student and the faculty member.” That may be so, but evidence suggests that this is exactly what is happening. As Fried (2008) attests, “attention is often controlled voluntarily [however], external events and visual stimulation can result in involuntary shifts of attention,” and while this is true in any classroom environment Fried’s findings led her to conclude that, “laptop use interferes with students’ abilities to pay attention to and understand the

lecture material.” This in turn was reflected in lower test scores. Furthermore, Fried suggests that students who struggle in class “are more likely to bring their laptops as a diversion.” This last finding is interesting insomuch as it raises the issue as why students’ bother attending class if they feel so disconnected from what is taking place. If it were not for the participation grade, would they attend at all?

Students in higher education are in a unique position where they pay upfront for education services rendered over a future time-period. In this regard, some students’ see themselves as consumers of education. This point is explored by Anderson (2008) who contends that some in the student population consider themselves the customer of an “expensive consumer product called education, and that [the professor is] a sort of highly paid barista who provides it.” Anderson goes on to suggest that if students “want to spend their tuition paid time surfing the Internet” that is their prerogative and nothing to do with the professor. Others take a similar view:

*Professors worry that as wireless networks and laptops become ubiquitous, students will direct about as much attention to the front of the classroom as airline passengers do to a flight attendant reviewing safety information (Young, 2006).*

Yamamoto (2008) points out that knowing you cannot keep the attention of students for all or even some of the time, some faculty is taking an alternative approach where the onus of responsibility resides with the student. If students “do not want to learn, then let them do what they want, and it will be reflected in their final grade’ (Yamamoto, 2008). Pinchin (2009) quotes a student at Simon Fraser University as saying, “my attention span only lasts so long. I don’t know what I would do without my laptop, plus I pay for this class, it’s my money, so if I fail I only have myself to blame.” Such sentiments are possibly more prevalent than many may wish, yet the idea of

multitasking is nothing new. McWilliams (2005), quoting Linda Stone, a lecturer at Towson University, attributes this “trying-to-do-everything-at-once phenomenon [to] ‘continuous partial attention.’”

Increasingly, many students are bringing their outside lives into the classroom, without regard for the implications this has on their ability to concentrate and participate in lessons, or how this might affect others. As Pinchin (2009) asserts, many students know they are unable to focus on more than one task at a time, yet juggling jobs, school, and home life as separate entities is not possible and the “luxury of sitting and concentrating on the lecture” is not viewed as a good use of time. This in turn results in an attention deficit not only for the student, but active involvement with a laptop can easily distract others around them and detract from the wider class experience.

One factor often overlooked is the health and wellbeing of students with respect to computing, its “addictive nature” (Lloyd et al., 2007; Mangan, 2001), and the growing issue of “Internet dependency,” brought about by third generation (3G) networking services and the plethora of new mobile devices such as the iPhone and Blackberry. How and to what extent such addictions to technology have on in-class participation by students remains unclear, though findings of a 2005 study suggests that nondependent students spent more time on academic research and studies (92%) versus dependent students who played games, surfed the web and visit pornographic sites (88%) (Lloyd 2007). Yet as Lloyd et al. (2007) contend, “technology could [further] interfere with these practices if students have dependent natures.” Mangan (2001), citing Elliott N. Weiss, associate dean for M.B.A. education at the University of Virginia’s Darden School, likens the Internet to “placing a big bowl of candy in front of students. They’d eat, whether they

were hungry or not.” In that respect, has the Internet become too much of a good thing, so ubiquitous that its very presence outweighs its advantages, and where controls are necessary to rein in the excesses of the technology, or is there a broader societal issue at play – one of technology etiquette?

The integration of laptops into the classroom environment has been a challenge from both the pedagogical standpoint and that of student application. While institutions are still developing new and innovative ways to harness the power of the technology, or in other cases to reduce the negative effect the technology may have within class, the issue of social responsibility with respect to technology remains underserved by the literature and in the broader context of the educational paradigm. Many institutions are struggling with “boundary setting and high tech classroom etiquette” (Hembrooke and Gay, 2003).

The term ‘digital citizenry’ (Ribble and Bailey, 2004) is not new, but within the context of the growing pedagogical debate on laptop usage in the classroom this issue is likely to gain in prominence. Whether it is called digital citizenship, “interpersonal intelligence,” or “etiquette education” (Bugeja, 2007), the misuse and abuse of technology may need addressing. Etiquette education, in terms of respect for oneself, respect for others, and for societal and ethical issues generally, are issues explored by Borja, 2006; Bhave, 2002; Bugeja, 2007; Jaschik, 2008, who suggest the inclusion of these topics within the curriculum.

As stated previously, low-tech distractions in the form of doodling, whispering, note passing etc. have a passive quality that involves either one student or at best those students on either side. Laptops are by design inherently more distracting and as Borja

(2006) contends, “students must learn how to amplify the academic applications of the computing devices, not just use them to pass electronic notes to each other or play games.” As McGlynn (2008) points out, “sometimes their [students] social connectedness creates distractions on the classroom.” For some, the issue lies with the lack of instruction on how and when the use of technology is befitting. Bujega (2007) asserts that an orientation class that addresses “when, where, and for what purposes technology is appropriate or inappropriate,” should be a requirement for all incoming freshman, yet for many it may already be too late to change such behaviors. Such classes would look at expected “norms and behavior with regard to technology use” (Ribble, Bailey and Ross, 2004) with respect to how such behaviors influences others, how such behaviors may “infringe on others’ rights,” and what “courtesy do [you] extend to others” when using technology.

Developing a set of basic rules and applying these as part of the curricula may reinforce patterns of etiquette. Ribble and Bailey (2004) outline the primary goals of such a class as:

1. *Students understand the ethical, cultural, and societal issues related to technology.*
2. *Students practice responsible use of technology systems, information, and hardware. [Quiet keyboards, turning off the sound, keeping power cables out of pathways etc.]*
3. *Students develop positive attitudes toward technology applications that support lifelong learning, personal pursuits, and productivity.*

Such an approach may work but as Young (2006) points out expectations must be created by the professor from the outset and then enforced. “The laptop isn’t the problem. It is teachers who refuse to engage students well enough and who don’t set proper boundaries as to what is and isn’t acceptable behavior in their classroom” (Young, 2006). The



alternatives are to maintain the status-quo or to enforce a so called “forbidden laptop zone” (Foster, 2008) in which students cannot turn on any personal electronic devices (Young, 2006). As Yamamoto (2008) argues,

*One reason that professors ban laptops or use of the Internet is out of respect for all students in the class. While students should respect each other, it is up to the professor to create and foster this environment in class. In many classes when another student starts to talk or ask a question, the other students start playing solitaire or doing other activities on their computers. This shows a lack of respect.*

Respect between teacher and student should flow in both directions though as Jaschik (2008) contends, “trying to teach people and do something positive for them, only to have them completely ignore you and disrespect your work by sending text messages or playing tic-tac-toe during class” is frustrating at the least. Jaschik goes on to say, “text-messaging is a very intentional behavior. One cannot unthinkingly engage in text-messaging.” However, students have a responsibility to use technical resources appropriately based on need and environmental circumstances (Lecher, 2005).

While the literature suggests some professors verbally communicate their expectations vis-à-vis in-class laptop etiquette (Jaschik, 2008; Terry, 2008), others believe that these expectations should form part of the syllabi or by placing a “prohibition of extra-curricular use of laptops during class in the student integrity code” (Yamamoto, 2008) as is the case at Columbia University’s Law School. While the latter approach is not the norm, more institutions are including clauses in syllabi with respect to laptops. At the Iowa State University, School of Journalism, approximately one-fifth of all syllabi incorporate such clauses. Bugeja (2007) provides two such examples:

1. *Anyone who engages in rude, thoughtless, selfish behavior, such as use of a cell phone for Instant Messages, games, etc., will have his or her cell phone confiscated until the next class session and will be excused from class. The*

*cell phone will be returned after the student apologizes to the class at the next class session.*

2. *If your cellular phone is heard by the class, you are responsible for completing one of two options:*
  - I. *Before the end of the class period you will sing a verse and chorus of any song of your choice or,*
  - II. *You will lead the next class period through a 10-minute discussion on a topic to be determined by the end of the class. (To the extent that there are multiple individuals in violation, duets will be accepted).*

By stating upfront the expectations and consequences of the class policy the implication is that the student only has himself or herself to blame if he or she then falls foul. Others take a similar view including Terry (2008) who tells his students that anyone caught using laptops for non-classroom purposes will be banned from bring any electronic device into class thereafter. This circumvents the collective punishment model some professors deploy (Jaschik, 2008), by placing the onus squarely on the individual. As Bhavé (2002) says, “the teacher needs to draw the line at what is permissible, no matter what is possible.” Jaschik (2008) echoes such sentiments and asserts that, “there is only one person in that room who has the bureaucratic, legal, and moral authority to establish discipline – and that is the instructor.” While this certainly should be the case, the power dynamics between teacher and student might not always produce the desired results. Irrespective of the in-class dynamics with respect to laptops “patterns of engagement are changing due to computers, yet many institutional services are barely keeping up with student expectations for technology” (Arend, 2004). If students are so bored with lectures that they prefer to surf the web, IM, or play games, why bother with class at all. As Bates (2009) attests, “if most students have laptops, why are they still having physically to come to a lecture hall?”

Many institutions offer online courses, often taken by commuter students, those with busy lifestyles, or those who want to avoid the typical classroom environment. Is non-class related laptop usage within the classroom indicative of a student's desire to forego the classroom experience? Certainly, email and video-conferencing makes communication easier and more convenient, as does the use of Blackboard and WebCT applications, and while "fostering these forms of communication between students and teachers" (Arend, 2004) is ongoing, research shows that most "curricula changes are accompanied by difficulties, inconveniences, and sometimes even resistance from both the teachers and the students" (Barak, 2006).

This raises a number of issues not least of which is for those students who choose to use their laptops in-class for "off-task use" (Fried, 2008) do they really want to be in class and does such activity suggest they would prefer to be elsewhere? To be sure, some students prefer distance learning to the traditional classroom environment, yet there are studies that show even distance education students prefer face-to-face instruction when it is convenient (Braun, 2008; Cragg, Dunning, and Ellis, 2008; Deka and McMurry, 2006; Summers, Waigandt, and Whittaker, 2005). As Arend (2004) remarks, the new dynamic for wireless networking, multitasking, and on the move technical communications, is changing the educational paradigm. However, to what extent might those technical changes affect the fundamental tenets of a bricks-and-mortar education, and is traditional education under serious threat? As Cutshall et al. (2006) suggest, "One of the main benefits of laptop computers in education is the 'learning anywhere, anytime' ability." If that is the case, one might argue that as goes the traditional library so might go traditional

classroom based teaching unless changes to pedagogical teaching methods address such issues.

Just as students are increasingly eschewing a visit to the library, preferring to research and acquire information resources via online databases and search engines (Arend, 2004), are students more likely to elect to take online distance education courses rather than participate in person? Some professors clearly see the warning signs and recognize that if students can access course resources remotely, how long will it be before they “attempt to rely on online resources as a substitute for class?” (Grabe, 2005). What implications does this have for the traditional university campus and how can academia respond in a way that provides outreach educational services while protecting and enhancing the fabric of the physical environment.

*The comparative advantage of traditional universities will be the learning environment they offer; if they focus solely on their informational role, they will rapidly become obsolete. The question, though, is whether large universities can establish the educational setting that sets them apart from commercial providers and justifies their additional expense. It may be that just a few small and expensive private institutions can continue without significantly changing the way they operate. The remainder will have to undergo fundamental change as technology permits mass production of instruction, and commercial competitors transform the higher education marketplace (Noam, 1998).*

Such questions and predictions are beyond the scope of this paper but are, nevertheless, important to the wider context in which to present the following research.

## RESEARCH METHODOLOGY

This study, taking a qualitative research approach, canvassed students for their perceptions, feelings, and beliefs on their personal use of laptop computers in-class and the use of laptop computers by other students, and if such behaviors were deemed bothersome, annoying or distracting either to them or those around them. In order to gather this information an online survey was developed to solicit the attitudes of students towards their own in-class laptop behavior and that of others. Specifically, the target population for the study consisted of all students enrolled in one or more SILS courses during the Spring semester 2009<sup>3</sup>. This included graduate students in the library or information programs, and declared undergraduate majors in the information science program. The choice of SILS students was determined by the type of degree programs available and the high percentage of computer orientated courses offered by SILS, which together represented a technically engaged and computer literate target population for whom laptop and PDA's were already a major part of the classroom environment. Table 1 provides an enrollment breakdown of fulltime undergraduate and graduate students in either the BS or MS information science programs or the MS library science program<sup>4</sup>.

	Undergraduate	Graduate	<b>Totals:</b>
Library Science	n/a	195	<b>195</b>
Information Science	29	75	<b>104</b>
<b>Totals:</b>	<b>29</b>	<b>270</b>	<b>299</b>

*Table 1: Bachelor and master's degree majors enrolled in SILS classes – Spring 2009*  
*Source: SILS Administration Office - November 7, 2008.*

<sup>3</sup> The primary researcher (Martin Borbone), studying for an MSIS at SILS during this period, excluded himself from the study and is not included as a member of SILS for statistical or analytical purposes.

<sup>4</sup> As of February 2009, SILS does not offer a bachelor degree program in library science. SILS does offer a bachelor degree program in information science.

The sections that follow detail the procedures and methodologies used to conduct this study, describing the survey design and implementation, the process taken to contact participants, participant response rates, and data collection and analysis.

### ***Survey design and implementation***

The survey (see Appendix A) consisted of a variety of closed-ended questions with multiple-choice answers. The majority of questions required the respondent to pick the most applicable answer based on their thoughts and perceptions. Several questions relating to in-class laptop usage and the activities students engaged in allowed for multiple answers. Stemming out of those questions were supplementary questions requiring respondents to select the top five (or up to five) activities that they had previously listed as those activities most frequently undertaken by them or seen undertaken by other students. Lastly, an open-ended question solicited additional thoughts, clarifications or comments that participants felt relevant to the survey or wider research project using a free-text response form.

The online survey consisted of 28 questions, which together with follow-on questions amounted to a maximum 42 possible response sets. To aid in focusing participants on specific genres and themes, the survey was split into three sections as follows:

1. The first section concentrated on the participant's views and perceptions as they pertained to *their* in-class laptop usage.
2. The second section solicited the perceptions of the participant as they related to laptop usage by *other class students*.

3. The third section sought to collect basic demographic information for analytical purposes relating to the participants degree status, age, sex, and their whereabouts when they took the survey.

Prior to releasing the survey, all applicable documentation relating to the survey questionnaire was submitted to the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill for review and approval.

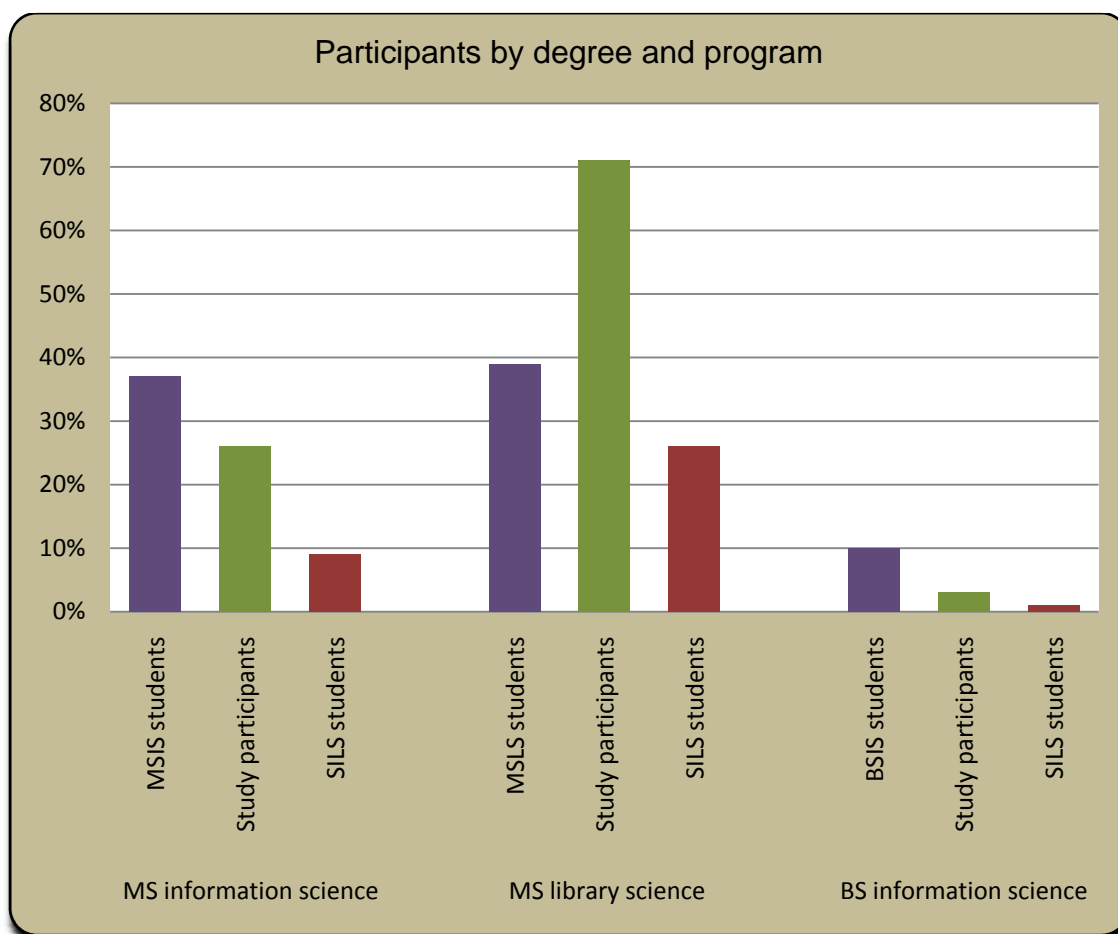
The survey was developed using Qualtrics.com<sup>5</sup> web-based survey software. This software package was chosen for its flexibility in terms of the types of questions that could be selected and for its scalability in analyzing large datasets. Throughout the survey, ‘skip-logic’ was employed channeling participants along different paths and, based on the participant’s prior response(s), to skip questions that were not applicable. This means that response rates for individual questions and sets of questions vary in accordance to the skip-logic rules and is in addition to questions a participant elected not to answer.

### ***Participants and participant response rates***

SILS maintains a variety of email listservs that are available to faculty, students, and staff to broadcast information to specific population groups. For the purposes of this study, two listservs were used to contact potential participants: *sils-masters@listserv.unc.edu* for all students taking either an MS in information or library science, and *sils-majors@listserv.unc.edu* for undergraduate students taking a BS in information science.

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<sup>5</sup> Details of the Qualtrics software package can be obtained from [www.qualtrics.com](http://www.qualtrics.com).



**Figure 1: Participants by degree and program compared with enrollment by degree and program (Q 24 of survey, n=298).**

The data in Figure 1 provides a breakdown of and participation rates for the different SILS student populations based upon degree, program, and as a percentage of total SILS students. The data highlights the corresponding number of students that participated in the research study (n=108) by degree and program and is further broken down as follows:

- MS information science (n=28) represents 28% of the total SILS graduate population:
  - 26% of all participants
  - 9% of the total target population
  - 37% of all MS information science students



- MS library science (n=77) represents 72% of the total SILS graduate population:
  - 71% of all participants
  - 26% of the total target population
  - 39% of all MS library science students
- BS<sup>6</sup> information science (n=3) represents:
  - 3% of all participants
  - 0.1% of the total target population
  - 10% of all BS information science students

The expectation was to achieve a 20% participation rate (n=60). This target was reached within the first 48-hours, though with only one undergraduate response. One week after the initial email was circulated a reminder email was sent to both the masters and undergraduate listservs in order to solicit additional responses primarily from undergraduate student community. In the event, only two additional undergraduate students participated in the study.

### ***Data collection and analysis***

The research survey went live via Qualtrics on 02/03/09 and an email (See Appendix B) sent via the listservs to all potential participants the following morning. Responses were monitored during the course of the first week and a reminder email (See Appendix C) was sent to both listservs on 02/11/09. The survey closed at midnight 02/13/09.

Prior to starting the survey, all participants were informed that participation was voluntary and that all responses would be kept anonymous. No personally identifiable information relating to individual participants was collected as part of the survey research other than the Internet Protocol (IP) address of the computer through which the

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<sup>6</sup> SILS population comprises 90% graduate students and 10% undergraduate students studying for a major in information science.

participant accessed the survey. The IP address was used within Qualtrics to track participation and ensure that only one set of responses was received from any given IP address. Such monitoring allowed partially completed surveys to be accessed and finished during the period the survey remained open. At the close of the survey all surveys were confirmed as complete and the IP address data was deleted from the results before any analysis took place.

Qualitative and quantitative (demographic) data was exported as a .csv file and imported into a Microsoft Excel spreadsheet for analysis. Qualitative data was reconstructed in Microsoft Excel to bring together questions of a similar nature such that a participant's view of his or her own behavior versus his or her views on other students' behaviors could be analyzed. Review of the data drew out key themes in terms of attitudes and beliefs, which either reinforced a given value set or on occasion provided contradictory information. Patterns, discrepancies, and relationships were noted for themes and sub-themes, the findings of which are presented in the results and discussion sections that follow. Quantitative data, primarily demographic information, was processed and presented at the beginning of the results section.

Textual data (n=29) relating to question 28 was exported out of Microsoft Excel and imported into Microsoft Word. The comments, opinions, thoughts, and suggestions as to future research opportunities were noted and form part of the discussion section of this paper.

### ***Limitations of the study***

Given the total population size under review, approximately 300 students, an acceptable survey response rate was set at 60 completed surveys, representing 20% of the total SILS

undergraduate and graduate student population. A 35.24% response rate was achieved from the graduate student population, while the undergraduate response rate was 10.3%. The discrepancy between these two figures can probably be attributed to a number of factors. First is the general lack of interaction between graduate and undergraduate students, and therefore the importance of the study may not have been fully appreciated at the undergraduate level. Deploying a survey/questionnaire across the user population, was deemed the most efficient and appropriate technique to elicit immediate feedback based on time and financial constraints imposed by UNC, Institution Review Board, and SILS. Most SILS students are used to filling in online surveys, especially when they know that such surveys are related to the research studies of a student within the school. However, having the name and affiliation of the primary researcher on the survey may have unknowingly influenced the response rate in a positive manner as students sought to support the researcher's studies. Another factor is the small numbers of undergraduate students in the population, which may have made them feel vulnerable to identification, or defensive if they felt that graduate students' may be critical of their practices. These factors are something for future research to look at as to what differences may exist between graduate and undergraduate student behaviors in the same school.

Response set bias, as an issue, may also be present in the findings. Due to the nature of the study, soliciting opinions with respect to an individual's behavior and their perceptions on the behaviors of others, may have resulted in some participants being less judgmental when it came to their activities and more judgmental when reviewing the activities of others. Human nature suggests individuals may downplay their own roles

where such participation puts them in a less than positive light, and play up the roles of others in similar circumstances.

While the high graduate response rate enables the results to be extrapolated across the broader graduate SILS body, the low undergraduate response rate may not be indicative of the opinions and beliefs of the wider SILS undergraduate body. As such, the findings should act purely as a guide and require future investigation to corroborate. Similarly, the restricted nature of the target population to SILS students means that any findings are limited solely to the SILS student body and should not be extrapolated farther across the UNC graduate body.

The primary researcher acknowledges his own personal beliefs and perceptions towards other student's usage of laptops in the classroom environment and was mindful at the time of writing that the survey questions and ensuing discussion remained neutral. To that end, the primary researcher was guided by his SILS advisor, Dr. Deborah Barreau, and sought counsel as necessary from other SILS faculty to mitigate any charges of personal bias with respect to the survey or to the interpretation of the findings, thereby safeguarding the validity and objectivity of the results.

The intent of this research was to gain valuable information on the views and perceptions of SILS students towards classroom laptop behavior. However, the sensitivity of the subject matter notwithstanding, it was anticipated that the results would generate sufficient new knowledge and interest that future replications of this study within other departments at UNC and among other library schools at universities throughout the United States would seek to validate or repudiate these initial research findings.

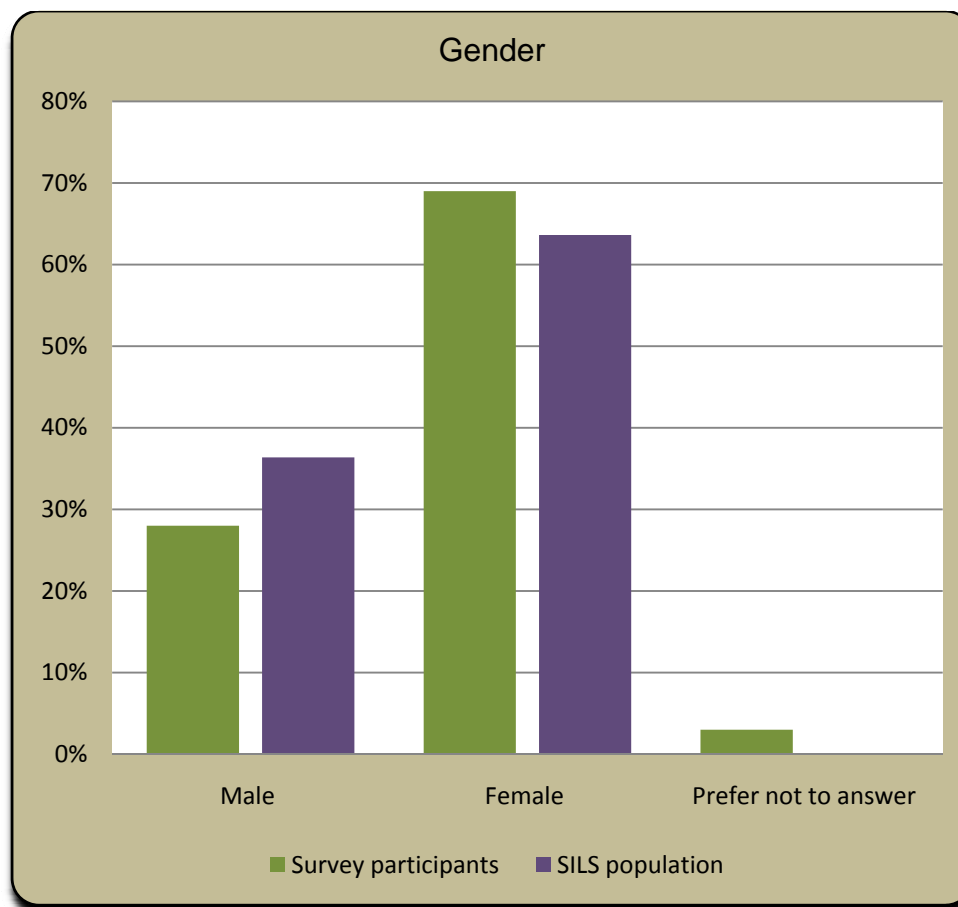
## RESULTS

This section presents the results of the study, outlining the quantitative and then the qualitative data. Results are not presented in the same order in which the survey questions were shown to participants. For example, demographic information presented to participants at the end of the survey is shown here at the beginning of the results section. The relevant survey question number is listed as (Q n) at the end of each figure.

The online survey was available for a period of ten (10) days during February 2009, and had 108 participants.

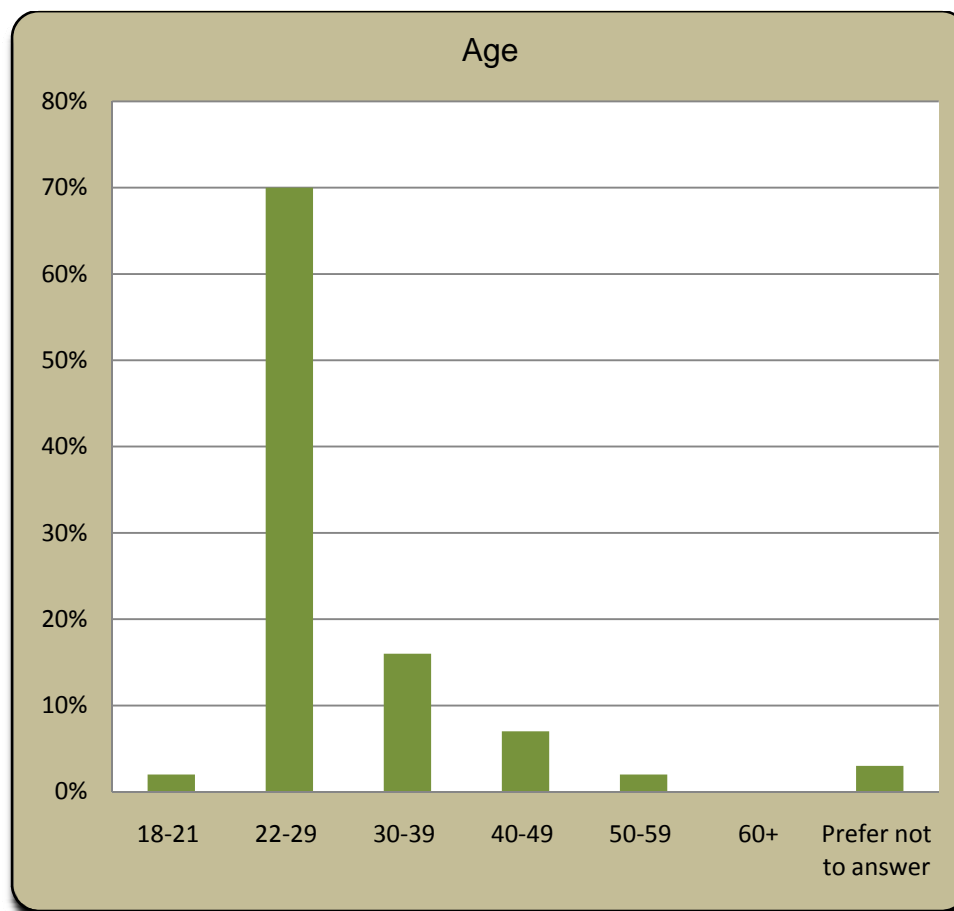
### *Quantitative Data Analysis*

Not every respondent answered every question, primarily due to the skip-logic employed within the survey. To account for this, the total number of respondents is listed for each question as (n=x) with further breakdowns of key data as necessary.



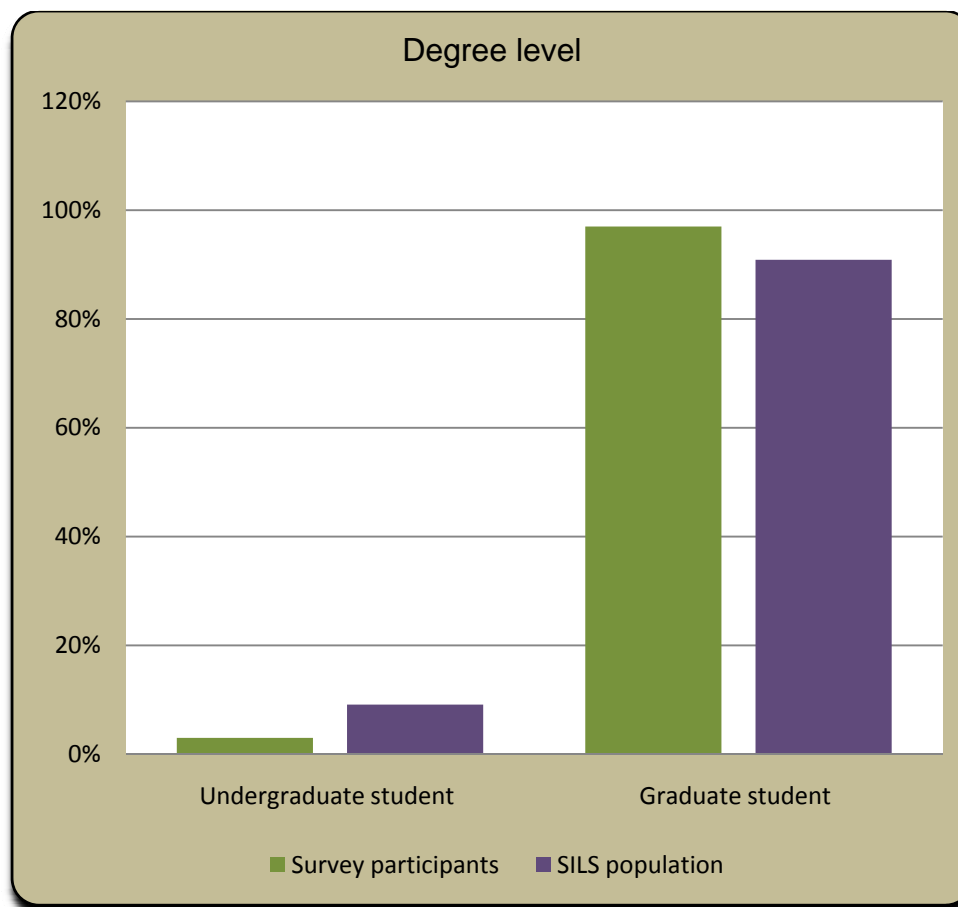
**Figure 2: Gender of participants versus SILS population (Q26, n=108).**

The gender of participants broadly reflects the wider SILS population with a slight preference in favor of female respondents. This margin of difference does not materially alter the results of the survey. Data displayed in Figure 2 shows female participants outnumbering male participants by approximately 2:1.



**Figure 3: Age of participants (Q 27, n=108).**

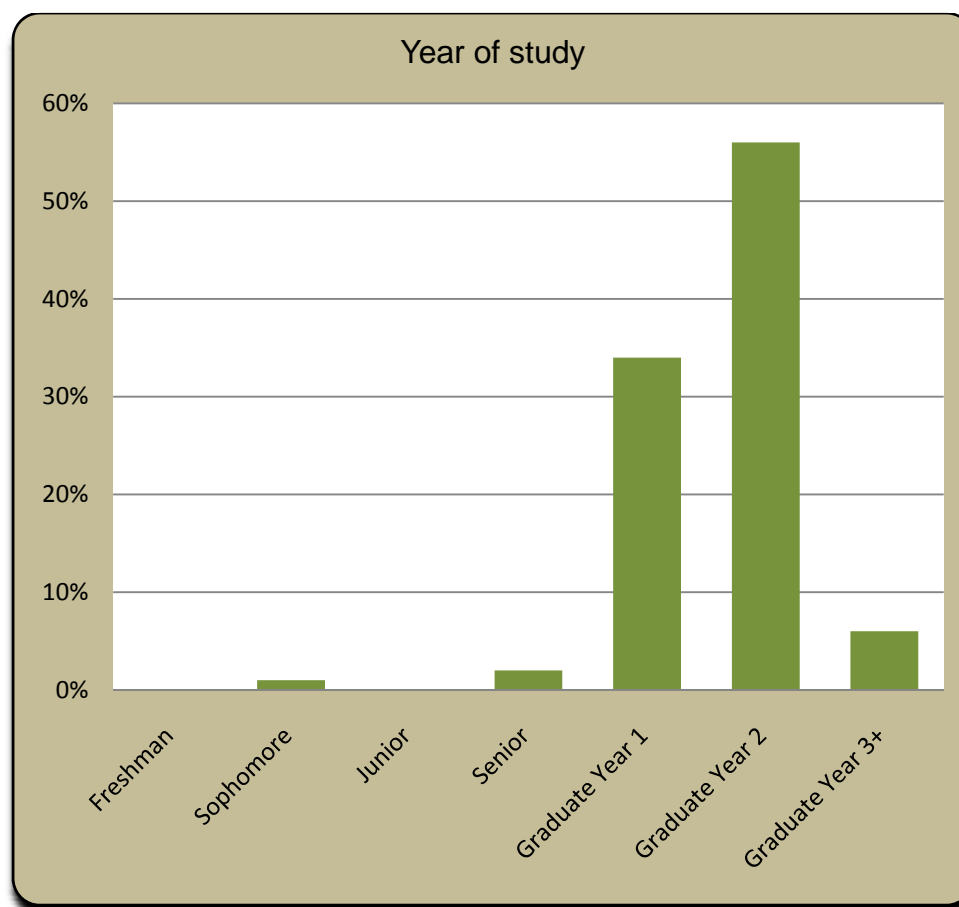
The majority of participants fell within the 22-29 age range representing 70.4% of all respondents. This mirrors the overall SILS student population. The 1.9% of respondents in the 18-21 age range represents undergraduate students.



**Figure 4: Degree level of participants versus SILS population (Q 23, n=108).**

The degree level of participants is indicative of and reflects the overall SILS population, split approximately 9:1 in favor of graduate students. Figure 1 (see page 31) provides a breakdown of students by degree program while Figure 5 provides an analysis of a student's year of study.

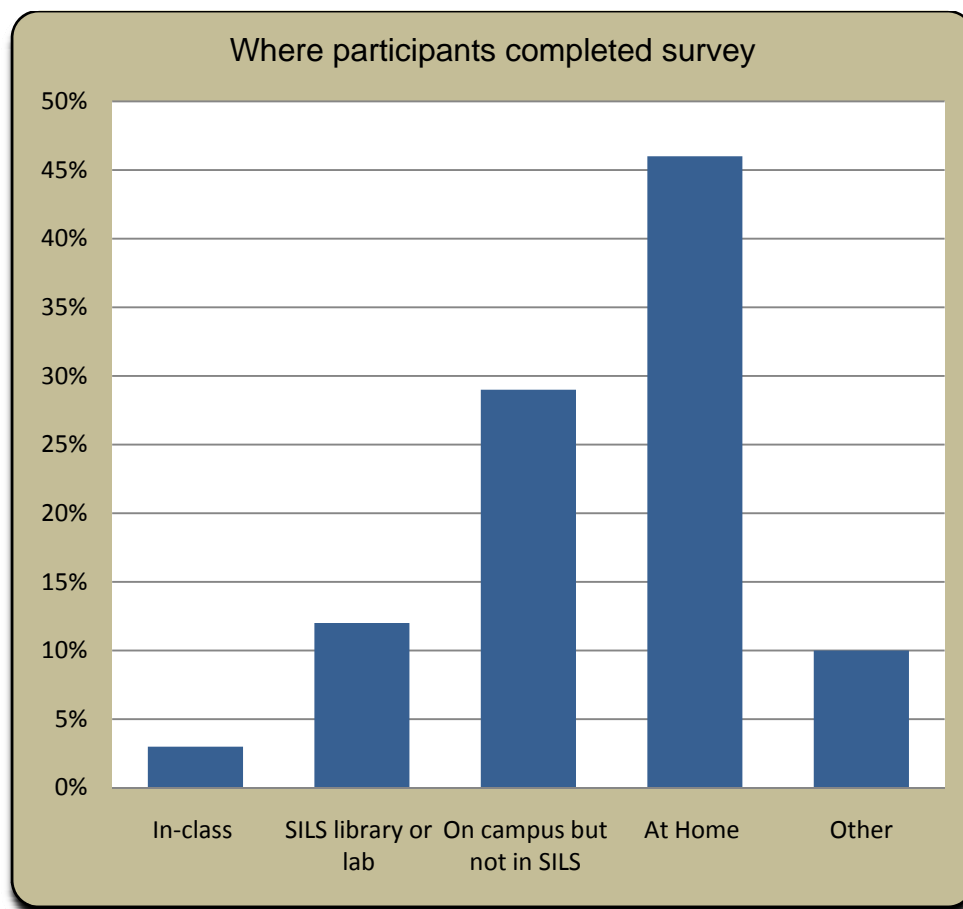




**Figure 5: Participants year of study as of Spring semester 2009 (Q 25, n=108).**

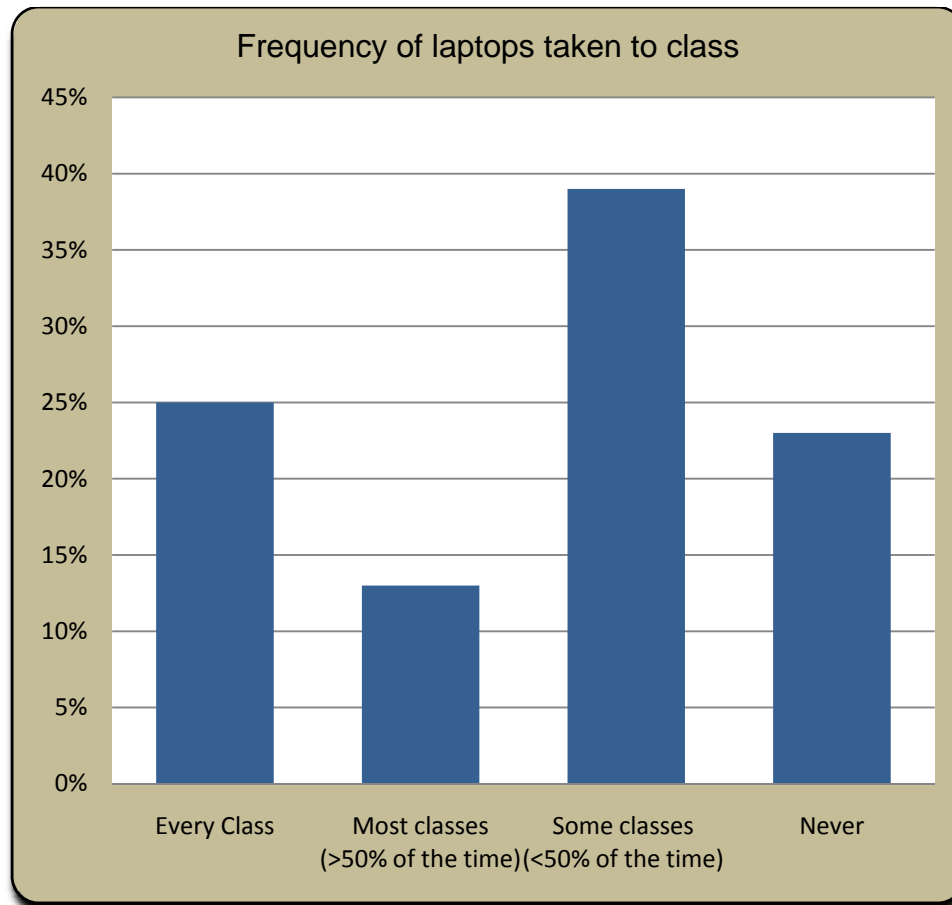
Approximately two-thirds of participants were in their second or subsequent year of study in the graduate program, with one-third in the first year of study. Three respondents were undergraduates; one sophomore and two seniors.

The disparity between graduate students in their first, second, and subsequent years of study is an area for further research as to why these response rates differ.



**Figure 6: Where did participants access and complete the survey? (Q 22, n=108).**

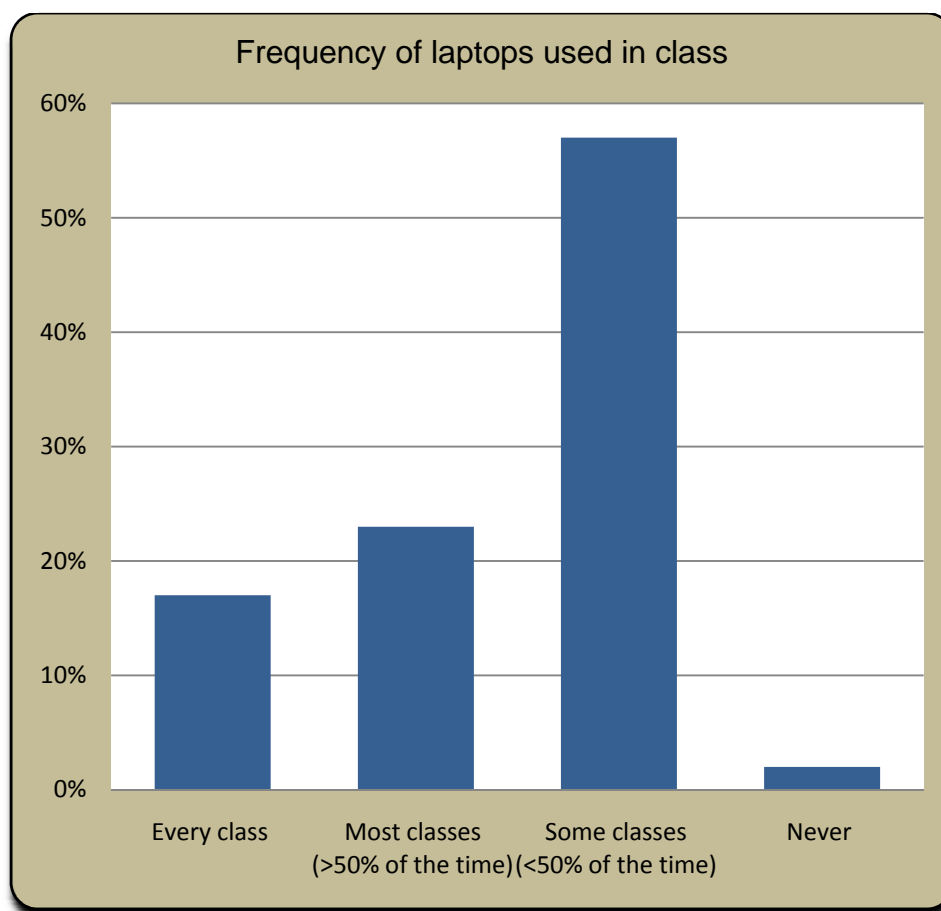
All participants answered this question of which, 46.3% of participants accessed and responded to the survey from home (n=50), 28.7% responded from somewhere on the UNC campus but not within the SILS computer lab (n=31), 12.0% responded within the SILS computer lab or library (n=13). Of note, and despite the nature of the survey research, 2.8% of students (n=3) responded during class.



**Figure 7: How often do participants take their laptops to class? (Q 2, n=108).**

Figure 7 and Figure 8 look at the availability and frequency of laptop use in class.

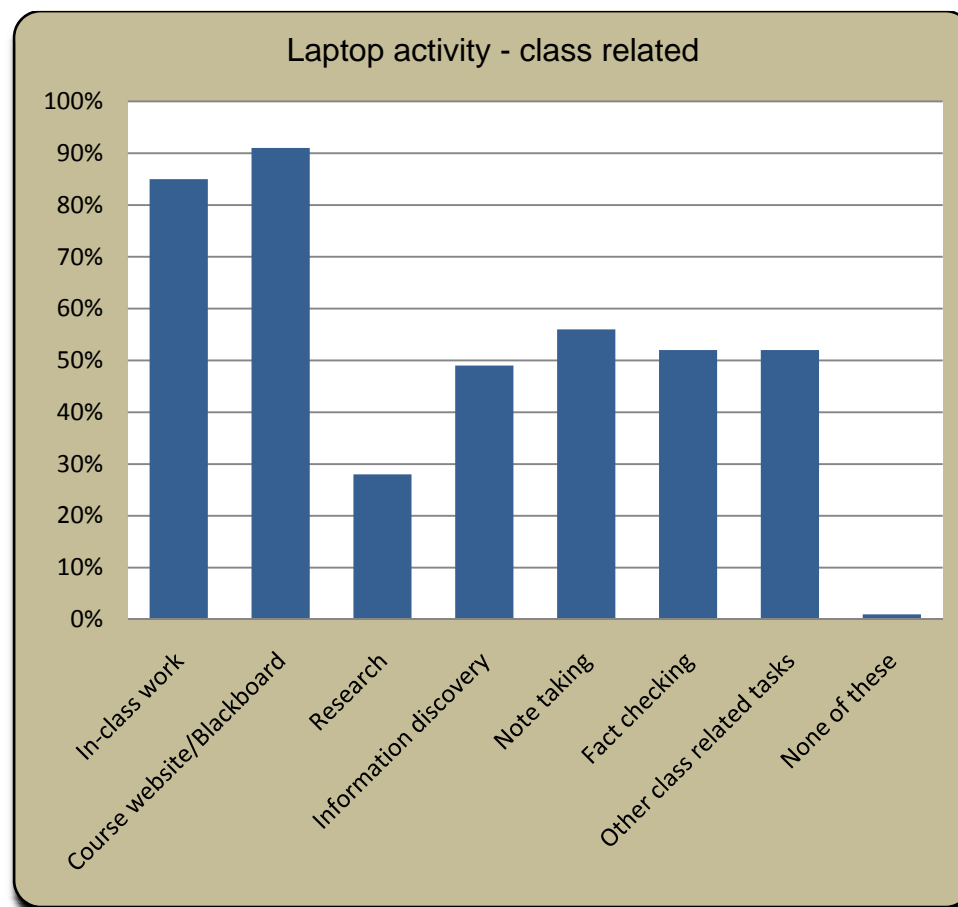
Figure 7 shows that of all participants, 25.0% of respondents took their laptops to every class (n=27), 13% took them to more than half but not all their classes (n=14), 38.9% took them to less than half their classes (n=42), while 23.1% of respondents never took their laptops to class (n=25). Although it would be interesting to know why these latter students never took their laptops to class, this was not part of the original survey questionnaire.



**Figure 8: How often do participants use their laptops in class? (Q 3, n=82).**

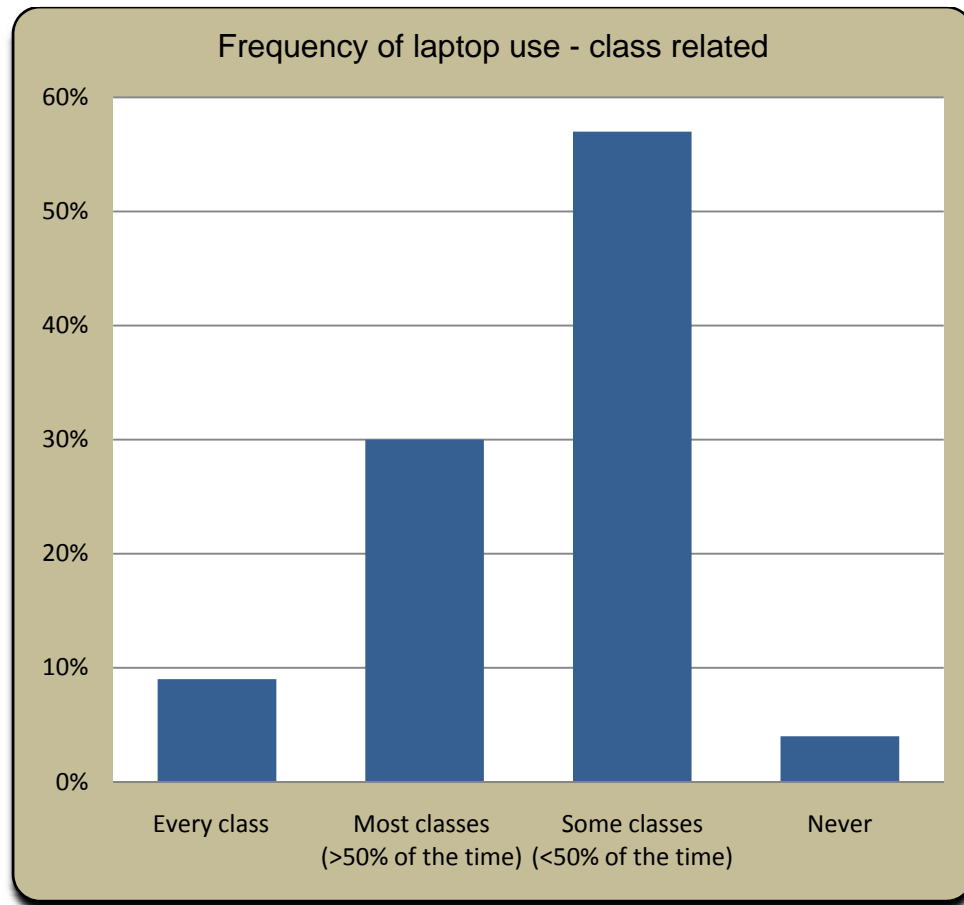
Of those students who took their laptops to class, 17.1% used them in every class (n=14), 23.2% used them in more than half of all their classes (n=19), 57.3% used them in some classes but less than half the time (n=47), and 2.4% never used their laptops in class (n=2). The latter statistic is interesting inasmuch as respondents carried their laptops to UNC but never actually used them in class. This implies there is another usage unrelated to specific class activity that future research could investigate.

Figures 9-11 look at laptop usage specifically related to class activities. Data excludes activities undertaken where laptops are required for class.



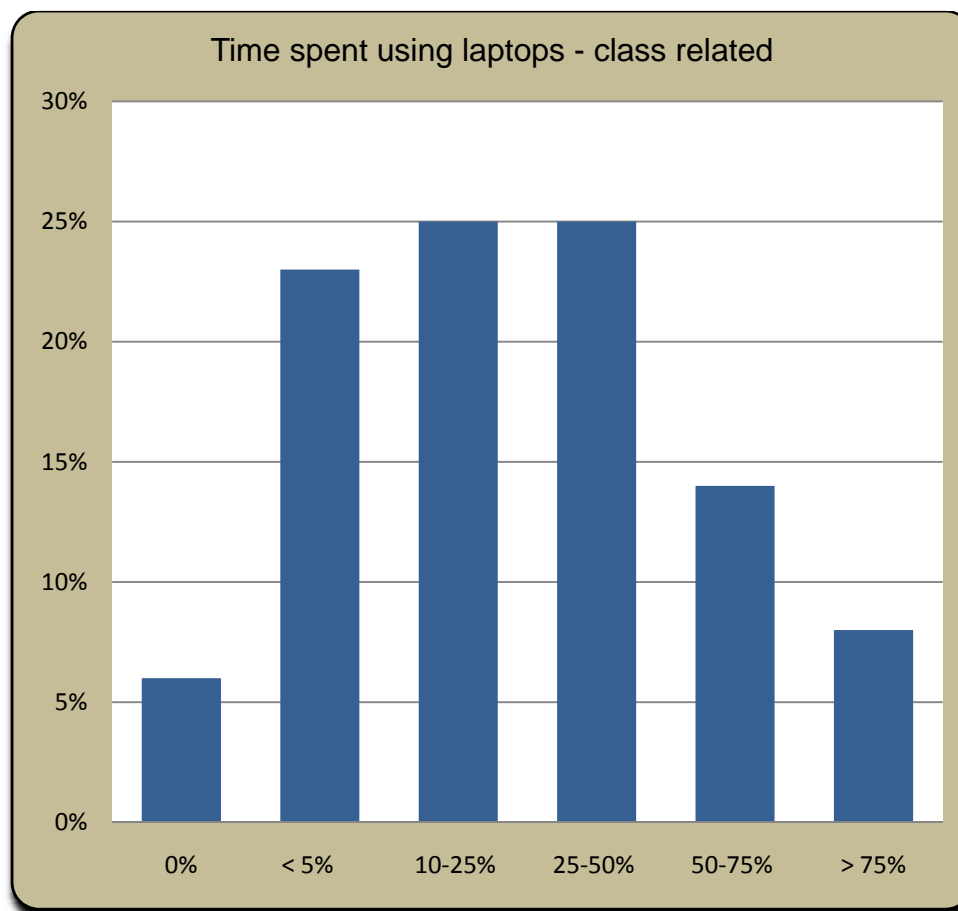
**Figure 9: Participants laptop activities related to class (Q 4, n=81).**

Participants were allowed multiple answers to the above (336 answers), which sought to identify in-class student activities used on laptops. 91.4% of respondents used Blackboard to access the class website (n=74), 85.2% used their laptops for in-class work of some description. Other activities of note included 55.6% of respondents taking electronic lecture notes (n=45), 51.9% used the web for fact checking (n=42), and 51.9% used their laptops for other class related activities not previously stated.



**Figure 10: Frequency of participant's laptop activities related to class content (Q 4a, n=80).**

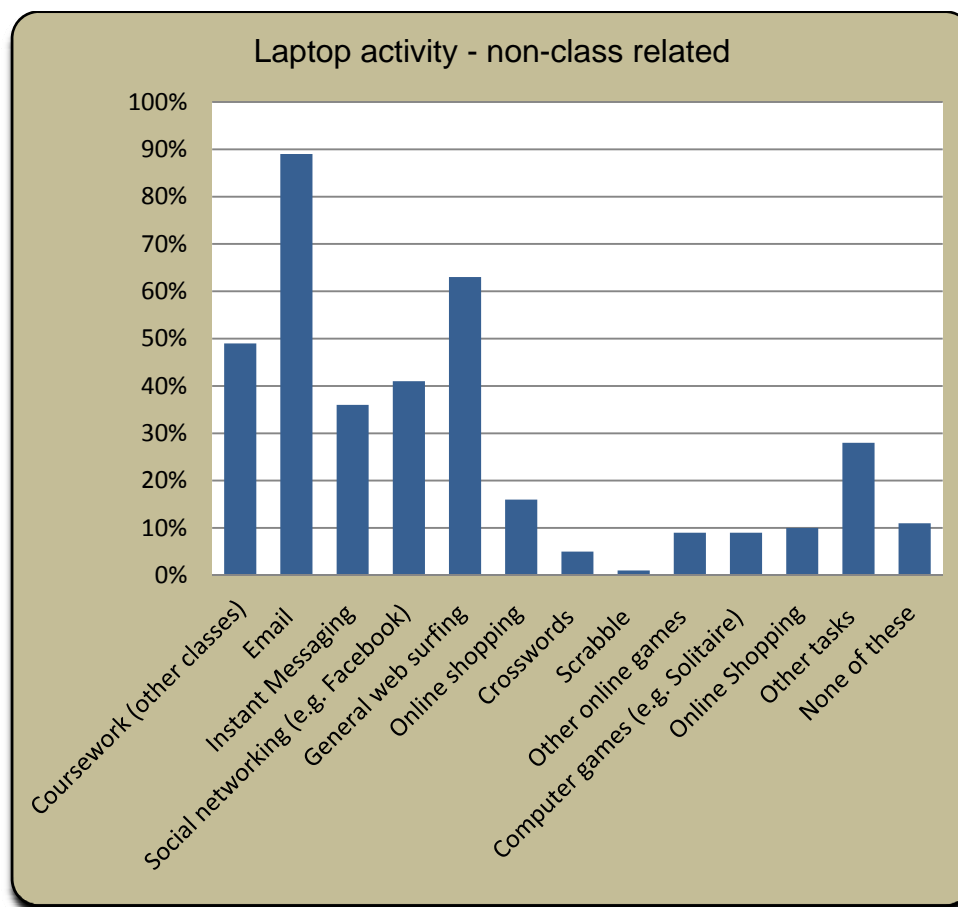
Of all participants, 8.8% of respondents used their laptops for class related activities in every class (n=7), 30.0% used their laptops in most but not all classes (n=24), 57.5% used their laptops in some but less than half of all class (n=46), with the remaining 3.8% claiming never to use their laptops in class (n=3).



**Figure 11: Time spent by participants on laptop activities related to class content (Q 4b, n=80).**

22.5% of respondents claim they spent less than five percent of their time using their laptops for in-class activities (n=18). 25% spent between 10-25 percent of their time on such activities (n=20). 25% spent 25-50 percent of their time (n=20), 13.8% spent between 50-75 percent of their time (n=11), and 7.5% spent more than 75 percent of their time on such activities (n=6). If these findings are accurate, they support the pedagogical theory that laptops are an integral and valuable tool as part of the educational process, or an overestimation of time spent using laptops on in-class related activities, or a combination of both. Additional research is required to ascertain the true nature of such use.

Figures 12-16 look at laptop usage specifically related to non-class activities including the varieties, frequency, and time spent on such activities and how respondents view their activities with respect to distracting other students.



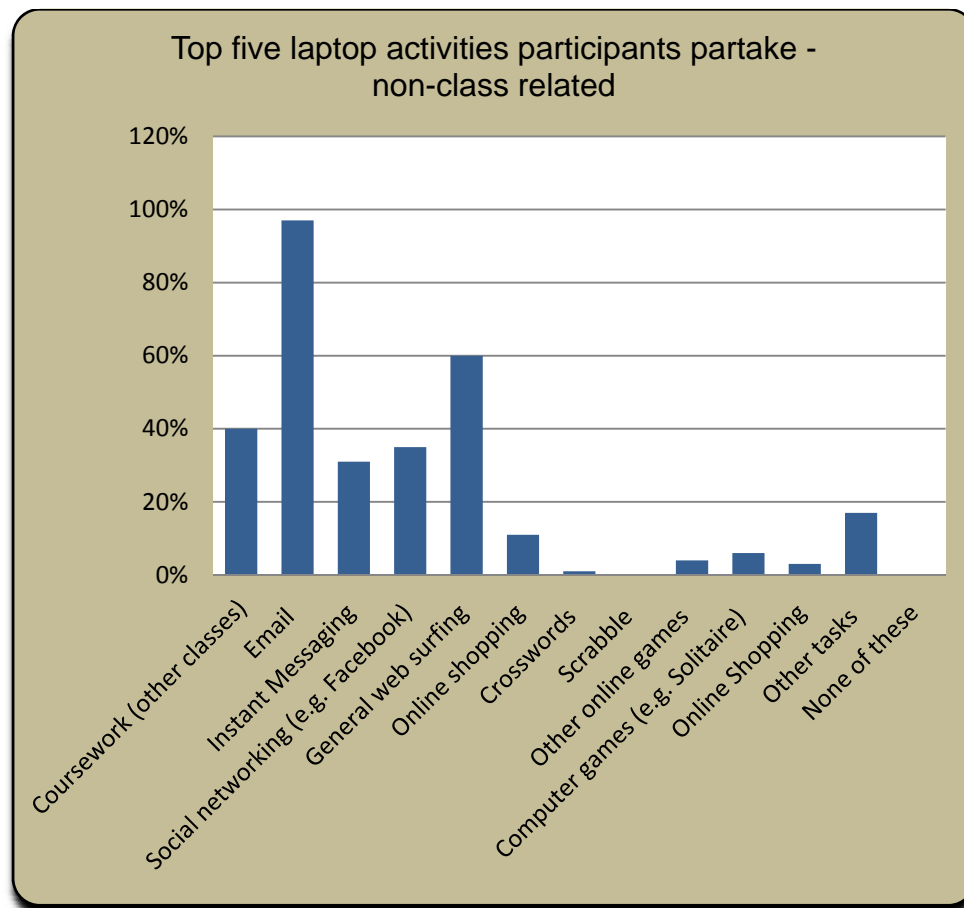
**Figure 12: Participants laptop activities that are not class related (Q 5, n=81).**

Participants were allowed multiple answers to the above (297 answers), which sought to identify for what *non-class* activities students used their laptops.

Email was the single greatest non-class activity reported by 88.9% participants (n=72). 63.0% of respondents engaged in general web surfing (n=51), 49.4% engaged in coursework for other classes (n=40), 40.7% viewed or updated social networking sites such as Facebook and Myspace (n=33), and 35.8% used some form of Instant Messaging



(n=29). All other activities were below 20% with the exception of “other tasks” selected by 28.4% of respondents.

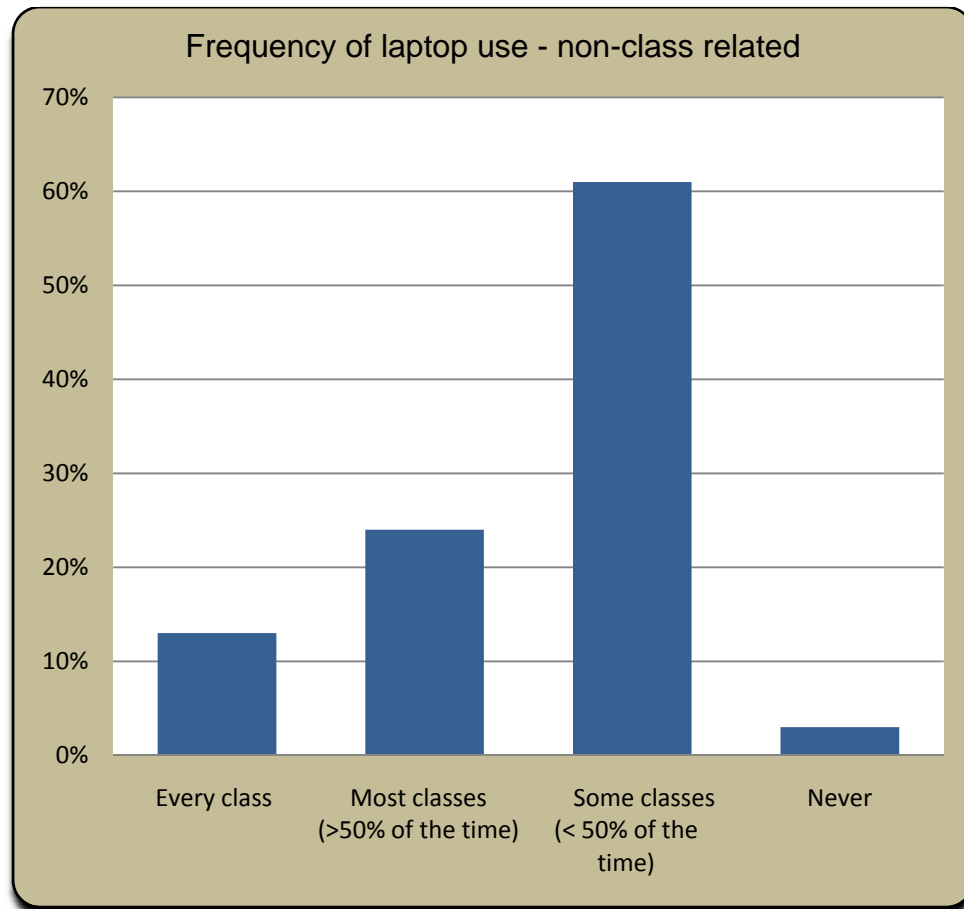


**Figure 13: Top non-class related laptop activities (Q 5a, n=72).**

Participants were allowed up to five answers and, based on their previous selection (see Figure 12), chose the following as the non-class activities they engaged in most often during class (219 answers).

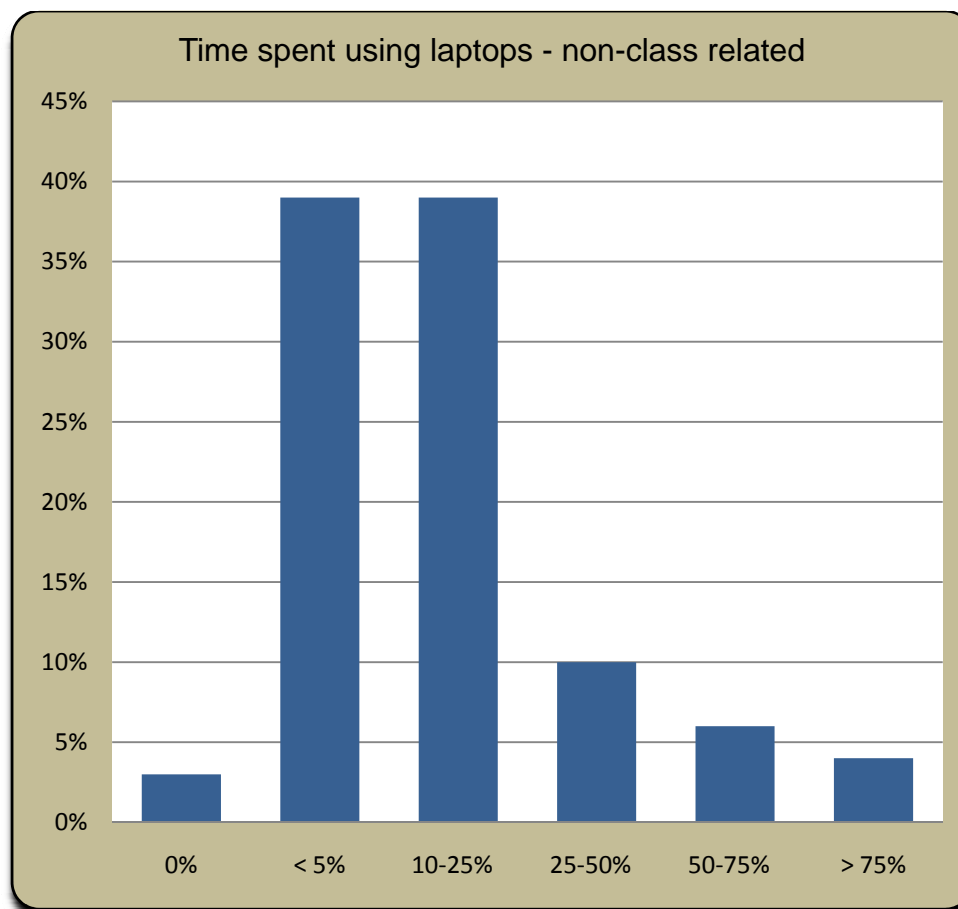
97.2% of participants emailed during class (n=70), 59.7% generally web surfed (n=60), 40.3% engaged in coursework for other class (n=29), 34.7% viewed or updated social networking sites (n=25), and 30.6% used some form of Instant Messaging (n=22).

Taken in combination there appears to be a link between the datasets of Figure 12 and Figure 13, as would be expected given the nature of the questions.



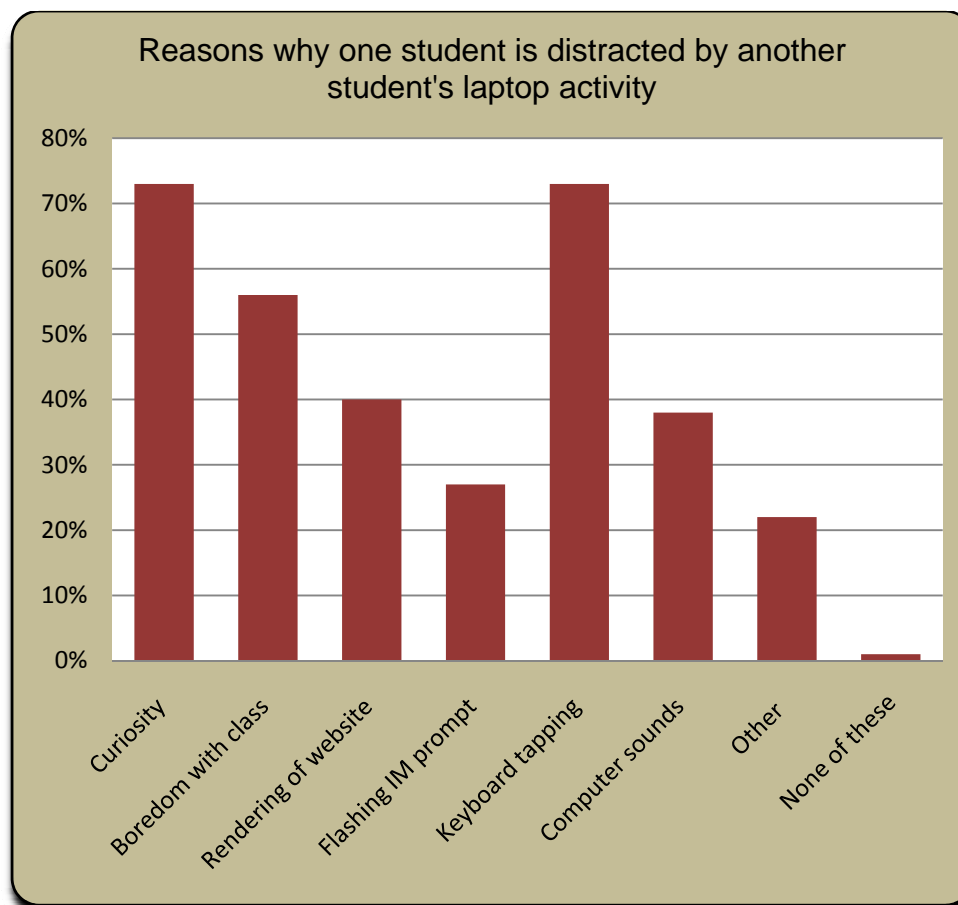
**Figure 14: Frequency of participant's laptop activities not related to class content (Q 5b, n=72).**

12.5% of respondents used their laptops in every class for non-class activities (n=9), 23.6% used their laptops in most but not all classes (n=17), and 61.1% used their laptops in some but less than half their class (n=44).



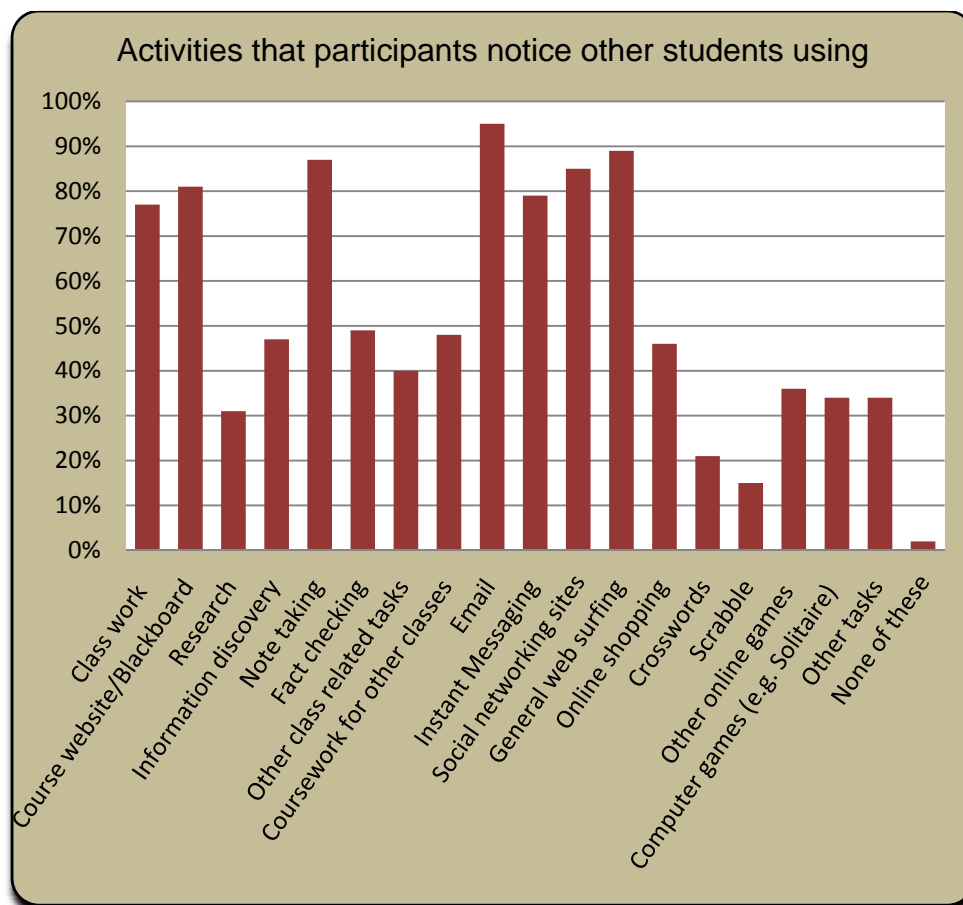
**Figure 15: Time spent by participants on laptop activities not related to class (Q 5c, n=72).**

38.9% of respondents spent less than five percent of their time using their laptops for in-class activities (n=28). 38.9% spent between 10-25 percent of their time on such activities (n=28). 9.7% spent 25-50 percent on such activities (n=7). 5.6% spent between 50-75 percent on in-class activities (n=4), and 4.2% spent more than 75 percent of their time on such activities (n=3). If these findings are accurate, they suggest that laptops may be a source of distraction when students engage in non-class activities or that students are over estimating the time they spend on non-class activities, or a combination of both. Additional research is required to ascertain the true nature of such use.



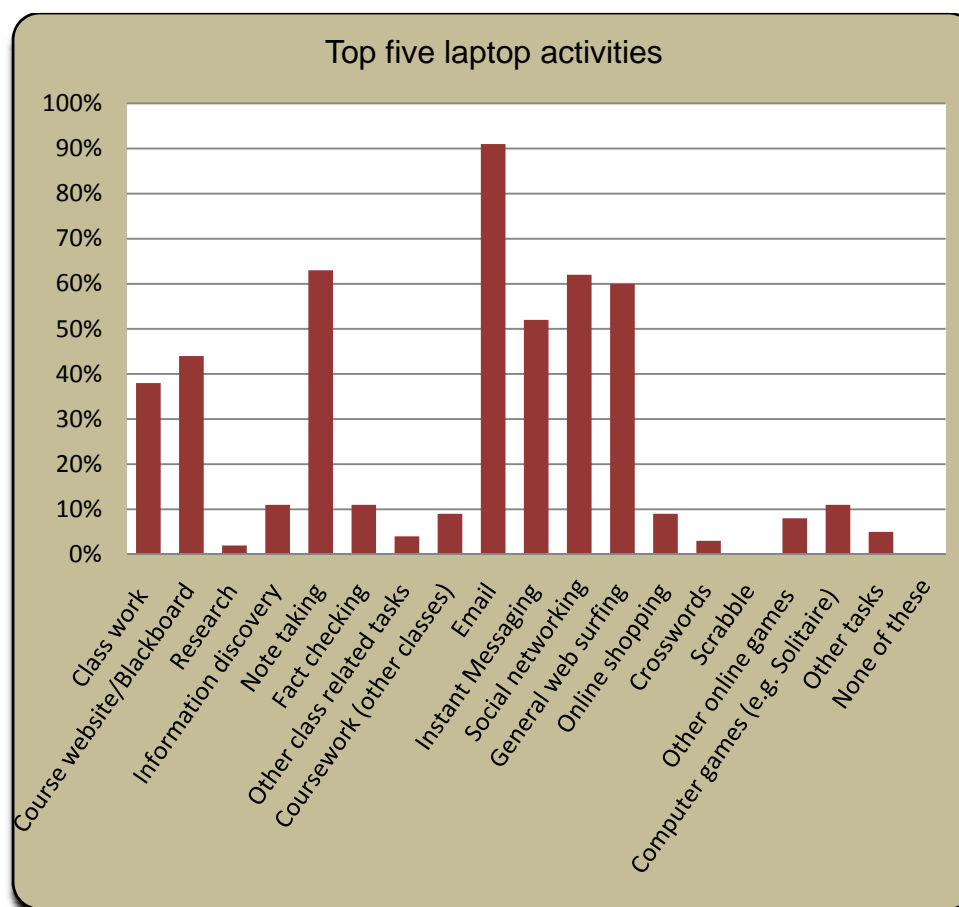
**Figure 16: Reasons for student distraction by another student's laptop activity**  
(Q 13a, n=107).

Participants were distracted by other students laptop activities, based upon a variety of reasons including 72.9% of respondents claiming curiosity (n=78) and a similar number claiming keyboard tapping as a major distraction. Over half of students, 56.1%, claimed boredom in class as the reason for being distracted by others, i.e. paying attention elsewhere other than the lecturer. Multiple responses were allowed for this question (354 answers).



**Figure 17: Laptop activities that participants notice other students' engage in during class (Q 14, n=107).**

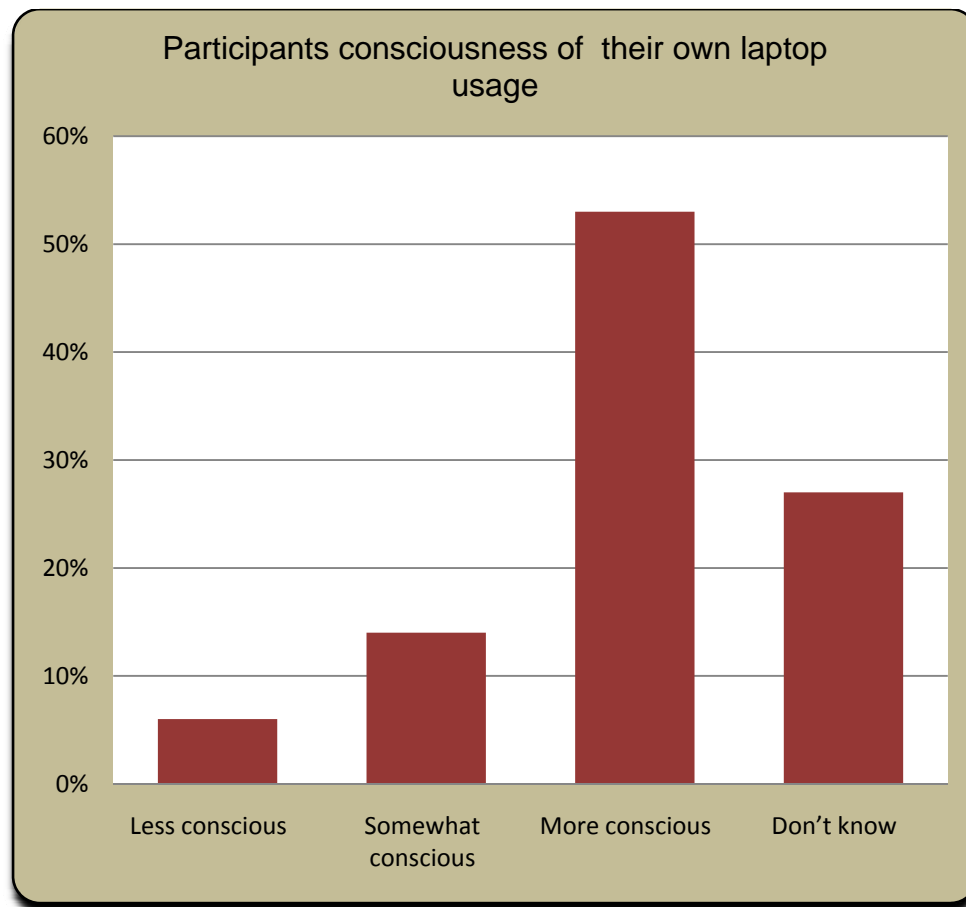
Participants noticed that other students engaged most frequently in the following activities. 95.3% emailed (n=102), 88.8% were generally web surfing (n=95), 86.9% took notes (n=93), 85.0% viewed or updated social networking sites (n=91), 81.3% used Blackboard for course information, 78.5% Instant Messaged (n=84), and 76.6% engaged in other class work. All other activities were below fifty percent. Multiple answers were allowed for this question (1063 answers).



**Figure 18: Top activities other students are viewed engaging in during class**  
(Q 14a, n=104).

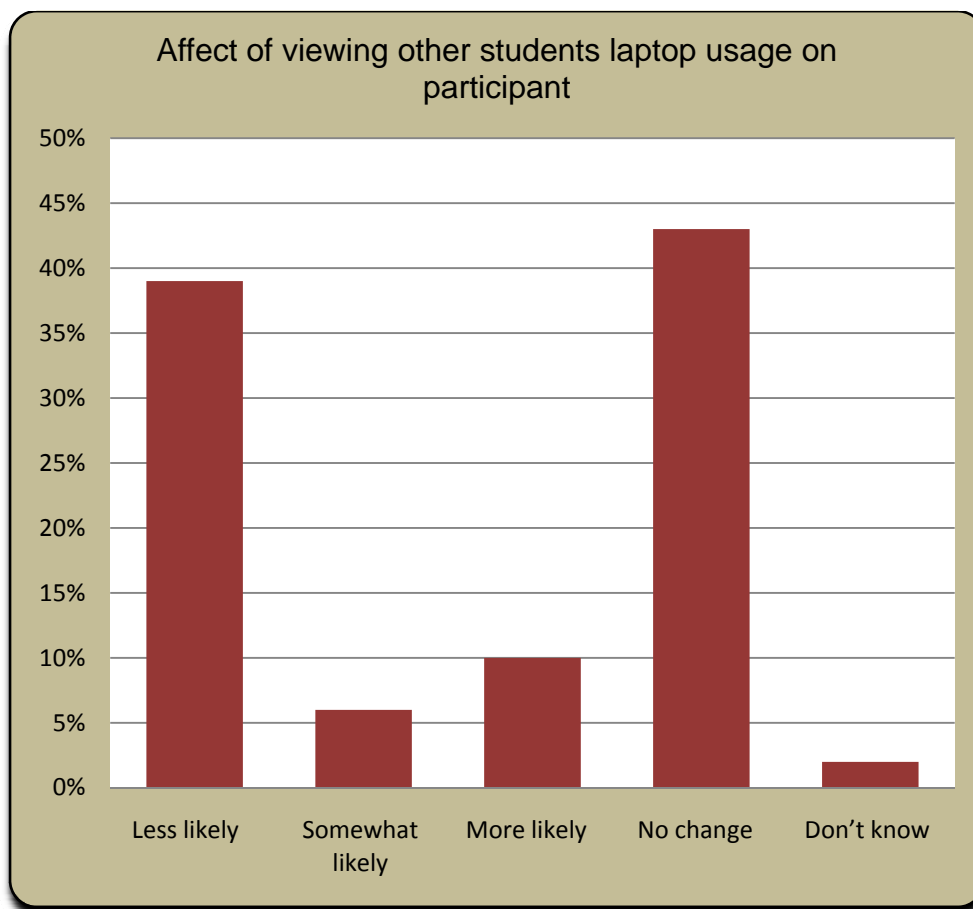
Participants were allowed up to five answers (499 answers) and, based on their previous selection (see Figure 17), chose the following as the top five non-class activities that *other* students appeared to engage in most often during class.

91.3% selected email (n=95), 63.5% note taking (n=66), 61.53% were viewing or updating social networking sites (n=64), 59.6% claimed general web surfing (n=52), and 51.9% were Instant Messaging (n=52). The two sets of figures are broadly in line with each other with respect to email, though a disparity occurs thereafter. Further analysis is required to ascertain why these disparities exist.



**Figure 19: How laptop usage by other students affects participant's consciousness of their own usage? (Q 15c, n=49).**

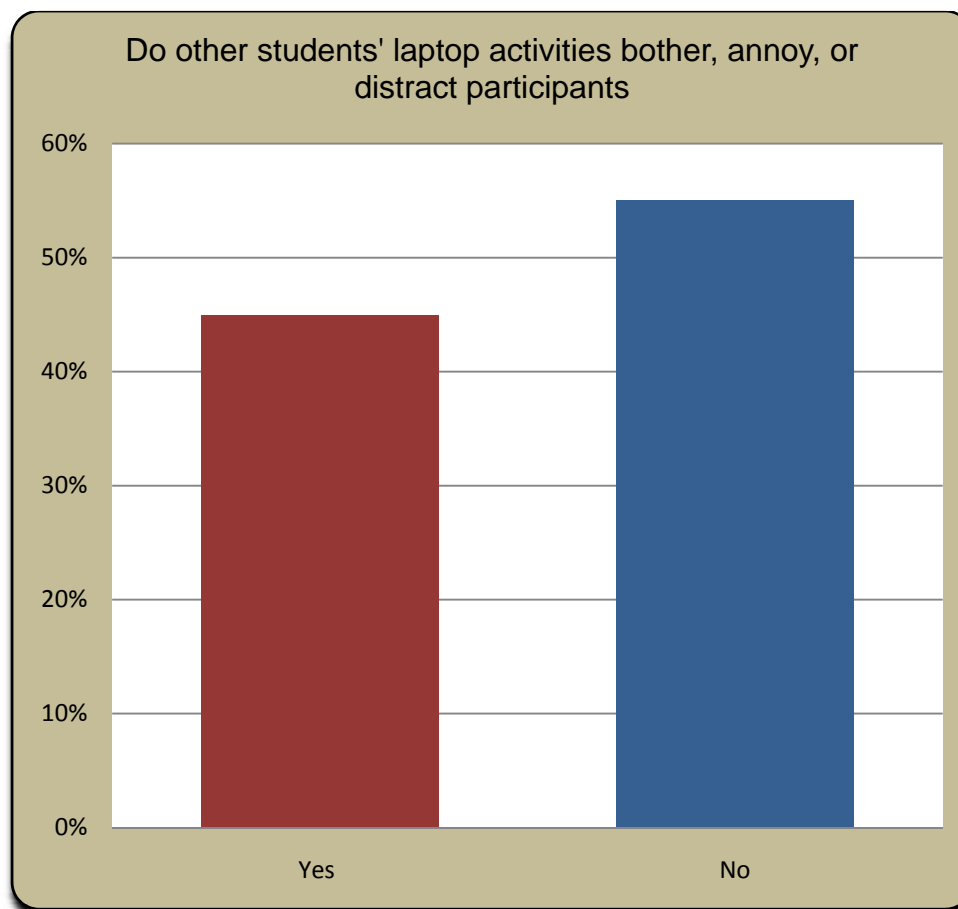
Participants claimed that 6.1% were less conscious of their laptop usage (n=3), 14.3% were somewhat conscious (n=7), 53.1% were more conscious (n=26), and 26.5% either did not know or had no opinion (n=13).



**Figure 20: Does viewing other students' using their laptop make participants more or less likely to use their laptops in class? (Q 15b, n=49).**

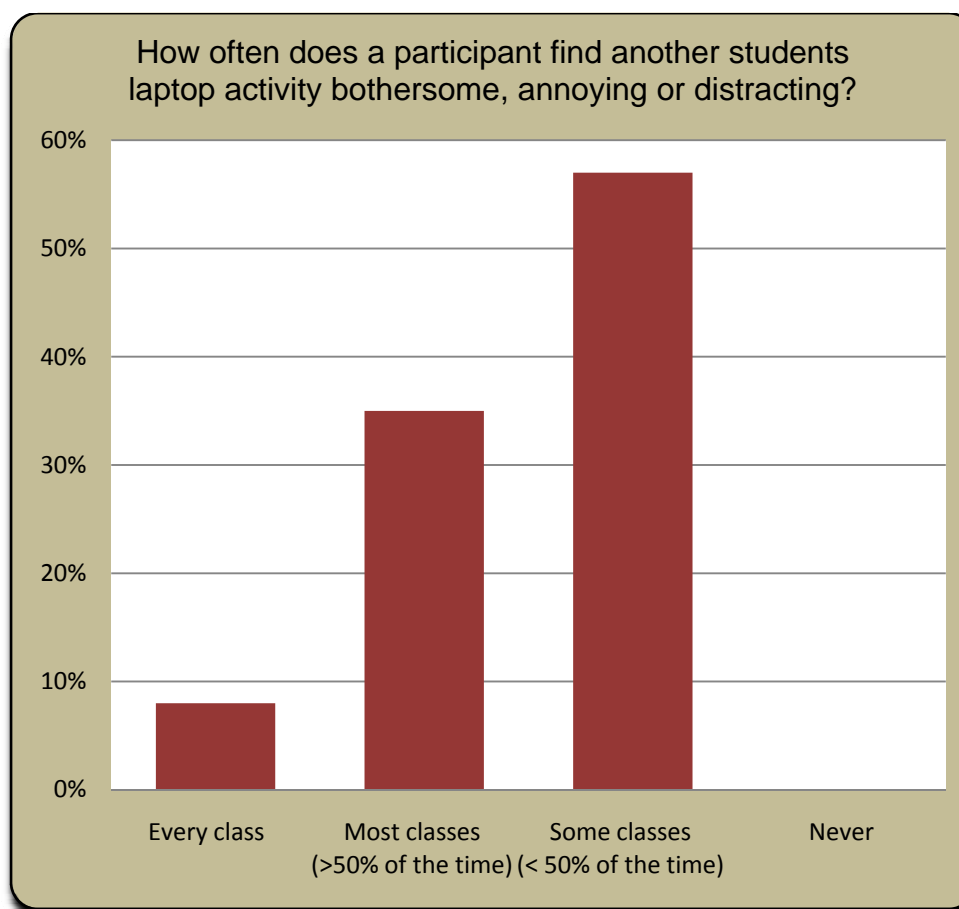
Most participants clearly do not believe viewing other students' laptop activity would materially affect their usage, and if it did, the effect would be slight.





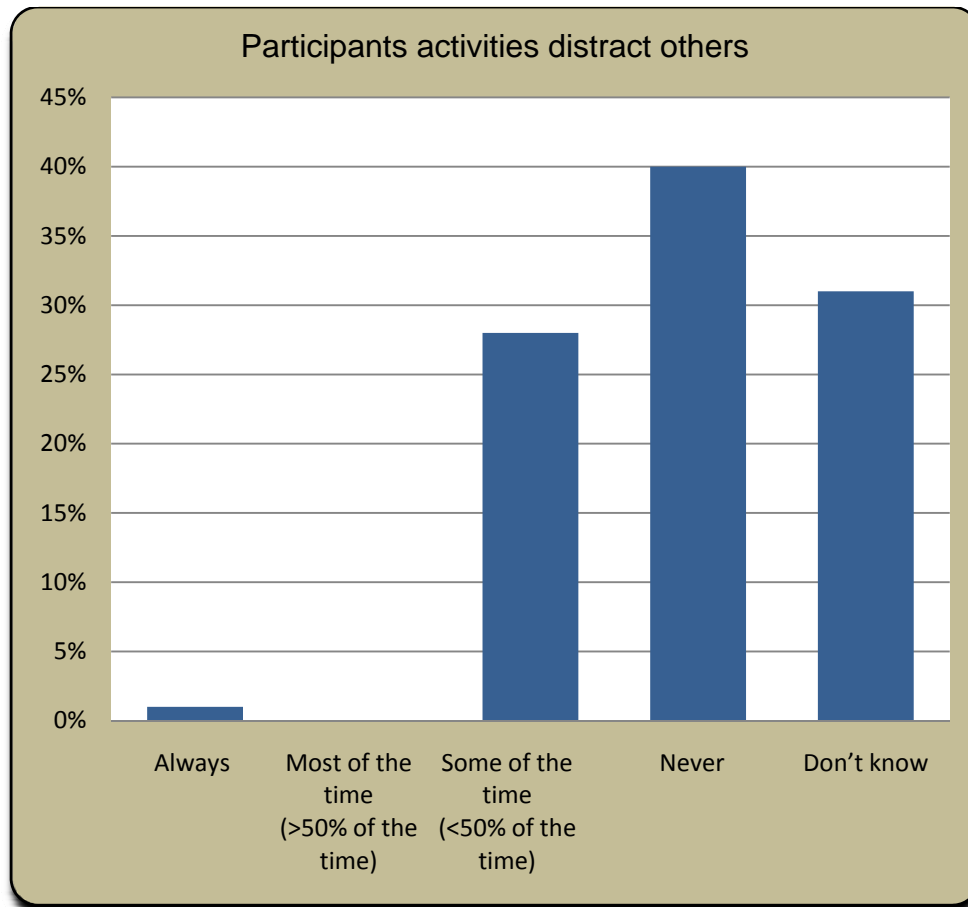
**Figure 21: Do participants find other students' laptop activities bothersome, annoying or distracting? (Q 15, n=108).**

45.4% of respondents claimed to be bothered, distracted, or annoyed by another students laptop activities (n=49), while 54.6% of respondents claimed they were not (n=59). Surprisingly, these figures are the reverse of the expected result, showing that most students either accept laptop usage as a given in class, or have no real opinion on such activities with respect to how this might affect them.



**Figure 22: Do participants find other students' laptop activities bothersome, annoying or distracting and if so, how often do they notice? (Q 15a, n=49).**

Participants claimed that 57.1% were distracted in some but less than half their classes (n=28), 34.7% were distracted in more than half their classes (n=17), and 8.28% were bothered, annoyed, or distracted by other students laptop usage in every class (n=4). These figures are less than anticipated, and may be the result of students not noticing, minding, or even recognizing when they are distracted. The results could also reflect that students do not perceive laptop use as a distracting mechanism and that for some it is considered *par for the course*.



**Figure 23: How often do participants believe their laptop activities distract other students? (Q 5d, n=72).**

Of all participants only 1.4% believed that their laptop activities distracted other students in the vicinity (n=1), 27.8% felt their activities distracted others some but less than half of the time (n=20), 40.3% believed their activities never distracted other students (n=29), and 30.6% either did not know or had no opinion (n=22).

The high occurrence of *never* is congruent with Figure 17 where a majority of respondents claimed they were never distracted by another students laptop activities. The large number of *don't knows* suggests that many students are either not aware of such distractions, or have not given the issue much prior thought.

## DISCUSSION

In analyzing the results of the study, a number of observations and generalizations were extracted from the data and are presented below. This discussion begins with a brief review of the demographic data before looking more closely at students' frequency and use of laptops, and the types of activities in which they engage. This is followed by a review of students' general levels of awareness with respect to their own laptop usage and how they felt toward various restrictions against such use during class. Does implementing a policy that curtails or otherwise bans laptops from class result in students feeling more or less involved with a class and how do such policies affect a student's decision-making process towards selecting an elective SILS course? This individual view of the world is compared and contrasted with a student's global perceptions of their peers. How other students were viewed using their laptops in class and what effects would policies that restricted such access have on those students. Finally, behavioral issues were examined with respect to how a student's personal activities potentially affect those around them and how other students' activities were perceived to affect the behavior of the individual student.

From the data presented, the majority of participants were female graduate candidates studying for a library science degree, which parallels the SILS student population. The majority of participants come from the 22-29 age range, a group that grew up during the digital era. For many of those students, computers and other digital technologies provide an *always-connected* environment in which the immediacy of the medium allows for constant connections between peers. In contrast, some participants in the older age groups, who are still coming to terms with the latest technologies and

gadgetry, may not feel as comfortable with the present demands of always being connected.

The success of the Carolina Computing Initiative, requiring all students at UNC to own a laptop computer, is confirmed by the findings of Question 1: “Do you own a laptop computer?” All respondents answered yes. While UNC mandates all incoming students own or otherwise have access to a laptop computer, there are no known procedures in place to authenticate or verify that students conform to such a policy. The results show that it is highly probable that most, if not all students, conform to this policy. The results reveal that three-quarters of SILS students take their laptops to at least some classes (see Figure 7) and as many as 40% of students claim to regularly take their laptops to 50% or more of the classes they attend, even though laptops are not required for those class. This raises additional questions such as why students’ take their laptops to class in the first instance, what compels them to start using them, and in what types of activities they engage. Although the study does not specifically address the former two questions, the evidence suggests many students habitually carry their laptops around with them to stay connected to the “outside world” while engaging in other activities including classes (Bhave, 2002; Pinchin, 2009).

Of those students who take their laptops to class, 98% claimed to use them at least some of the time during the class period (see Figure 8) and that the time spent on class versus non-class activities was broadly equal (see Figures 10 and 14). What cannot be determined from the data is whether class and non-class activities are engaged in at the same time, i.e. email is running in the background as a student concurrently accesses the course website. If that were the case, then the time spent on overall laptop usage in class

would be expected to reflect the number of simultaneous tasks undertaken. Further research is required to determine a) if concurrency of activities does take place, b) how participants came to allocate the time they spent on such activities, and c) if participants grouped class versus non-class activities separately or together when thinking about allocating time.

With respect to behavioral issues, the research suggests that general curiosity (78%) and keyboard tapping (78%) are the two main factors as to why a student may look at another student's screen (Figure 16). Certainly, some students are "heavy-handed" when it comes to using a keyboard and others just have noisy keyboards, which suggest that there is potential value in developing noiseless keyboards or micro-touch keypads. However, this does not resolve the curiosity factor and what makes students look up or over towards another user's screen. While there is a strong possibility that the noises associated with typing first rouse a student's curiosity to see what is going on, his or her curiosity may also be piqued by visual cues such as the rendering of a website, the flashing of an IM prompt, other computer sounds, or through his or her own boredom. While there is no clear connection between these two factors, it is feasible that a variety of visual and aural cues, either individually or collectively, are the primary factors at work. Indeed, further research is required to determine the distance that such disturbances are heard or viewed and how far away students need to be in order not to be distracted.

Perhaps less surprising is the spread of activities in which other students are seen to engage. Figure 17 highlights the wide range of class and non-class activities undertaken; while Figure 18 provides an insight into the frequency with which it is noticed that others engage in such activities. While it is known that students use their

laptops for a broad range of activities, including note taking, accessing the class website via Blackboard, and general class work among class related activities, and email, web surfing, social networking sites, and Instant Messaging figure equally as high among non-class activities. However, when students were asked to select the five activities they thought other students engaged in most frequently, the picture changes. Less emphasis was given to class related activities (Figure 18). Indeed, the only class related activity to appear in the top five was note taking, with the other four places held by non-class activities. Email was selected by 91% of students, note taking 66%, social networking 64%, web surfing 62%, and Instant Messaging 54%. The results support the theory that students use their laptops for both legitimate reasons and non-class activities, though with a greater emphasis given to non-class activities. When reviewing themselves, are students being less objective in their personal assessments of their laptop usage yet more so when it comes to assessing the usage of others? From the data it is not clear, and while this study did not set out to address such issues it suggests that future research into actual versus perceived behaviors be conducted to delve deeper into such laptop habits.

What appears to be the case is a connection between self-awareness and subsequent use of laptops. When students were asked if they felt more or less conscious of their own laptop usage when noticing similar behaviors in others, two-thirds of students claimed that they were somewhat conscious (Figure 19). Within this, 53% of students attest that they were more conscious of their own usage. Comparing these results with a similar question that asked if students were more or less likely to use their laptops in class if they saw others using theirs, 84% of students were somewhat or more likely to moderate their own use (Figure 20). Some behaviors encourage others to act in a similar

manner, the herd instinct, but in this case the opposite appears to be true. What needs researching further is the incidence and time spent on non-class activities and whether these results support the initial finding that student's moderate their own behavior when confronted with behaviors that they find annoying or bothersome. Such research could also include a threshold test to determine individual tolerance towards annoyance or bothersomeness, as part of the evaluation criteria.

Having discussed how the activities of other students affect the consciousness and likelihood of an individual student using their laptop in class, students were asked if they found such usage bothersome, annoying, or distracting. 55% of participants stated that no, they were not bothered or annoyed by such activities, while 45% said they were (Figure 21). Of those who said they were bothered, annoyed, or distracted, 57% claimed they felt this way in up to half of all classes, one-third were bothered by such activities in over half of all classes, and 8% were bothered in every class (Figure 22). Although in total this group represents less than half the student population, the size of the group who are bothered, annoyed or distracted is large enough to suggest that the ability to concentrate fully in class is adversely affected by such activities for a substantial minority of students. That being the case, it would seem appropriate to implement measures aimed at curbing excessive laptop use where the effects are known to be detrimental to the wider learning experience of others. Interestingly, when it came to assessing themselves and how their laptop activities might distract or bother other students, 40% of participants claimed that their activities never distracted others (Figure 23). Only 28% felt that their activities impinged on others' comfort levels or ability to concentrate, while 31% either did not know or did not wish to respond to this question. The findings reveal a 5-16%



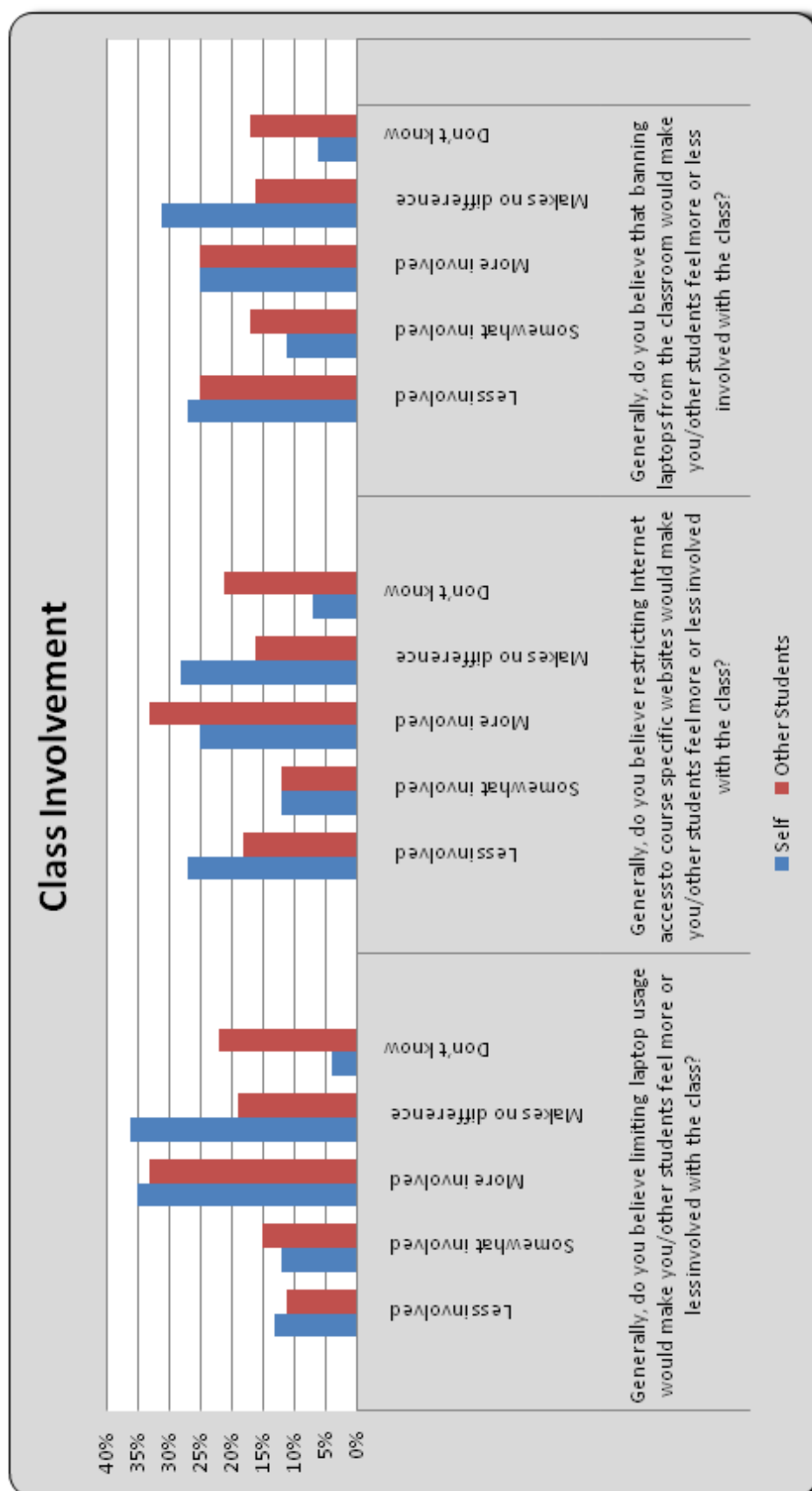
variation<sup>7</sup> between a student's perceptions of how his or her laptop use does not bother others, and the number of students claiming to be bothered by such activities.

When it came to generally limiting laptop usage in class, 36% of students believed it would make no difference to their level of involvement or participation, while 35% felt they would be more involved (Figure 24). This compares with 19% of students who felt that limiting laptop use would make no difference to other students' involvement levels, and 33% believing it would increase their involvement. The number of students claiming that they would feel less involved in a class if laptop use was restricted is consistent across both groups, standing at 12% for individuals commenting on their own involvement and 11% for other students. While it appears that the majority of students remain neutral or somewhat agreeable to the benefits derived through some form of laptop restriction, the evidence does not suggest any real desire to see such restrictions implemented. Indeed, any such restrictions would appear to have limited value in terms of increasing participation levels.

When students were asked how they might feel regarding their involvement within a class if Internet access were restricted to course specific websites, 25% believed they would be more involved in class, 28% of students claimed it would make no difference to their level of involvement, while 27% asserted that they would feel less involved in class. When asked about their perceptions of other students, 33% thought their peers would be more involved in class if Internet access were restricted, 16% thought it would make no difference and 18% felt their peers would be less

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<sup>7</sup> The 5-16% variance range was predicated on a conservative and liberal interpretation of the data in Figures 21 and 23, and the inclusion or exclusion of different data sets.



**Figure 24: Student views on class involvement and participation given different laptop restriction.**  
(Q7/Q16, Q8/Q17, Q9/Q18, n=107 in all instances).

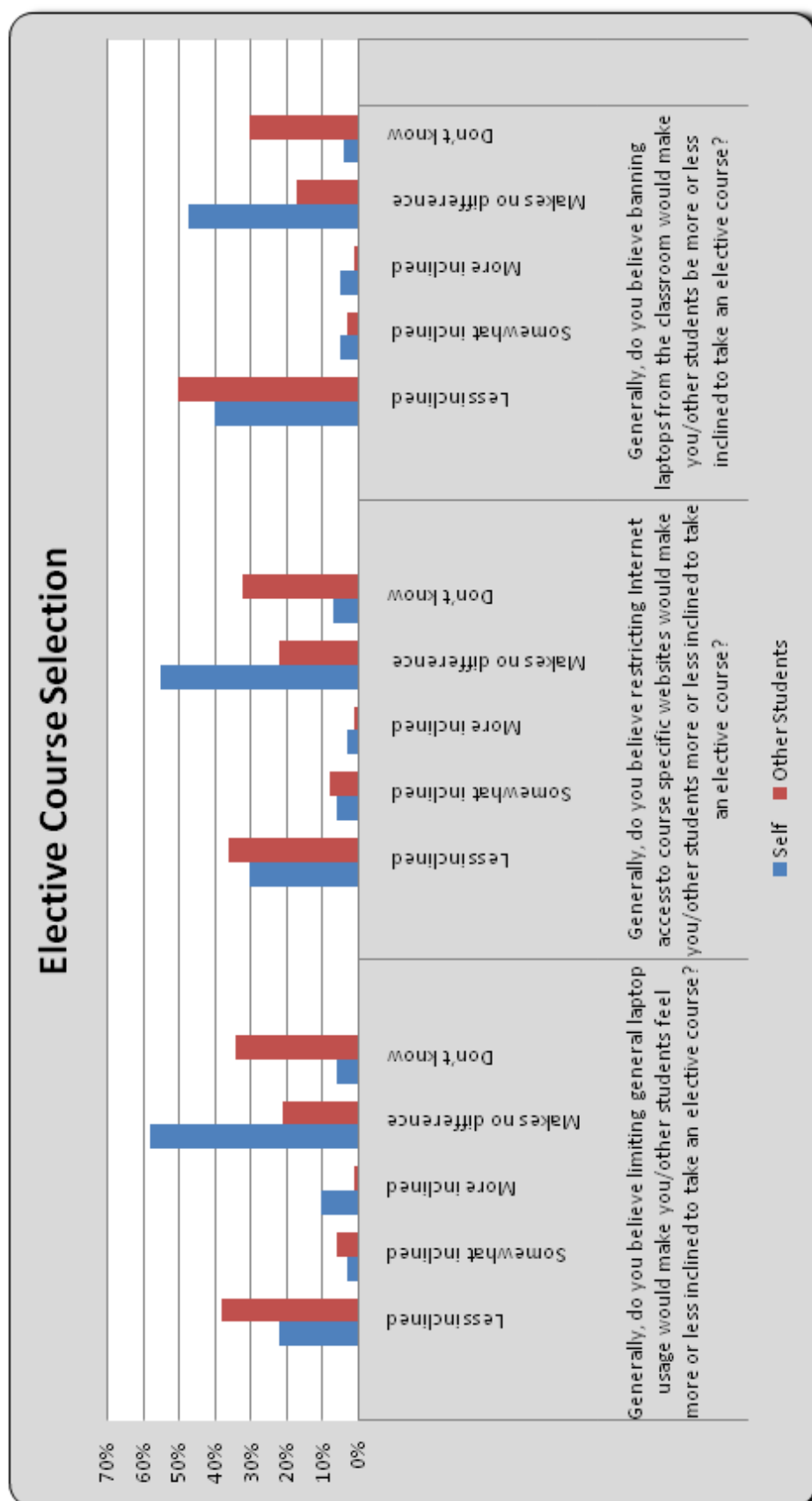
involved. Such data supports the theory that many students believe they can multitask and remain engaged in the class, yet when it comes to their peers, they give the impression that limiting Internet access would help them engage more. While students indicate a desire to access the Internet during class, they appear somewhat willing to forgo the same accessibility for their peers in the belief that this will result in their peer's greater class involvement. Further research is required to ascertain if students are advocating unregulated Internet access for themselves yet supporting regulated access for others.

When it came to banning laptops outright, 31% of students claimed it would make no difference to their level of class involvement, a finding consistent with earlier results. This suggests that for approximately one-third of students a ban on laptops would not materially affect their class involvement from current levels. This figure dropped to 16% when students were asked how they felt their peers might react to a similar scenario, a finding similar to that for curbing Internet access to course specific websites. Those that believed they or their peers would be more involved with class if laptops were banned outright accounts for 25% within each group, with those claiming to feel less involved representing 25% of students and 27% of student's reactions towards their peers. In many respects, these findings are a washout insomuch as one quarter of students believe a ban would be beneficial while another quarter believe a ban would be detrimental to class involvement. One-half of students were either neutral in their perceptions or chose not to answer.

Two general themes appear out of the previous three scenarios; limiting laptop use to class specific activities, restricting Internet access to course specific sites, or banning laptops from the classroom. First, there appears to be a potential connection

between increasingly restrictive laptop policies and a perceived decline in overall student involvement in class. Second, there is a possible link between restricting Internet access to course specific sites and the banning of laptops. This latter finding suggests laptop use, and especially Internet access, is ingrained for many students as part of the classroom environment. Any curbs placed on laptop use or Internet accessibility is likely to result in a student feeling less involved in class, even when they are participating in non-class activities. Internet access and the ability to partake in online activities during class seem acceptable behaviors by many, despite the distracting affect that such activities might have on the student or those around them. This is borne out by the findings illustrated in Figure 24, which looked at restricting Internet usage to course specific websites, and covered the outright banning of laptops from the classroom.

The final set of data (Figure 25) sought to identify changes to the decision-making process of students with respect to elective courses and various forms of laptop restrictions. If they knew in advance that an elective course limited general laptop usage to class activities, 58% of students contested that it would make no difference to their decision-making in selecting that course. This figure dropped significantly to 21% when asked to assess their peer's reactions. 10% of students stated that they would be more inclined to take an elective course if they knew that laptop usage was limited, but this figure fell to 1% when considering their peers. 22% of students claimed that they would be less inclined to take such a course, yet attested that 38% of their peers would feel this way. It is unclear as to why there appears a disparity in the numbers, yet it would be interesting to research the number of students who signed up to a given set of elective courses where one set had no laptop restrictions and the other set had an assortment of



**Figure 25: Student views on elective course selection given different laptop restriction.**  
(Q10/Q19, Q11/Q20, Q12/Q21, n=107 in all instances).

restrictions (up to a complete ban). By monitoring the sign up rate for each course, and gauging how quickly and how many students each course attracted, we could determine the popularity of courses with respect to restrictions versus non-restrictions. Based on the data thus far, the elective courses without laptop restrictions are expected to fill the fastest and attract more students than the set of courses with progressively restrictive laptop policies in place.

A similar pattern to that above emerges when asked how students would react to restricting Internet access to course specific websites. 55% of students said that such a move would make little difference in their selection of an elective course yet they assert that only 28% of their peers would feel the same way. When it came to feeling more inclined about taking such an elective course there were few takers for either group. Only 3% of students felt they would be more inclined to take an elective course if Internet access were restricted, and similarly students felt only 1% of their peers would do likewise. When asked to consider if they would be less inclined to take such a course based on restricting Internet access, 30% of participants agreed this would play into their decision-making processes and they claimed that 36% of their peers would feel similarly.

Lastly, when asked how an outright ban on laptops would play into the decision-making process for selecting an elective course, the trends from above continue though it appears more polarized. 47% of students attested that such a move would make no difference to their course selection criteria and that 17% of their peers would feel similarly. Only 5% of students felt they would be more inclined to take such a course, while students felt that only 1% of their peers would do likewise. When asked if the

banning of laptops from a given course would make students less inclined to take that course, 40% agreed it would and that 50% of their peers would probably do likewise.

In part, this final set of data reveals that students are affected by laptop policies and that for many, limiting either general usage, restricting Internet access, or banning laptops from the classroom is likely to have an adverse affect on their partaking of an elective course. What was not determined during this research was how such a ban may or may not affect core classes that are essential to a masters' degree in either library or information science.

## **CONCLUSIONS**

Clearly, this study raises more questions than it answers and indeed provides a wealth of opportunities for future research including:

- Exploring differences in gender, age, level of degree, and program between bachelor and graduate students behaviors towards technology within the same school:
- Determining the effective distance for avoiding student distraction and the ideal comfort zone in which students can operate without bothering or annoying others:
- Examining variation in response between first-year graduates and second-year plus graduates, and bachelor students:
- Assessing motivations behind why a student brings his or her laptop to class and if behavioral activities vary based upon a specific class or upon the requirement or non-requirement of a laptop in class: and

- Developing a tolerance threshold test to determine individual levels of annoyance, bothersomeness, or distraction, as a variable against which to test additional hypotheses

Given the reasonable response rate for the study (see Figure 1, page 31), it is possible to extrapolate these observations with a level of certainty that they reflect the views of the broader SILS graduate body. These observations also provide the basis for future hypothesis testing in areas of key interest for replication across other schools of library and information science and within and across other departments and universities.

It is clear that laptops are an integral feature of the classroom environment and that, love them or hate them, most students want access to the Internet during class. Despite the fact that many students are bothered, annoyed, or distracted by other students' laptop use, they are not willing to give up the right to have access to such technology themselves even when they feel that by doing so, involvement and class participation would increase.

While the findings suggest a connection between increasingly punitive laptop policies and decreasing levels of student involvement, the extant literature suggests that students who engage in non-class activities are generally better at retaining information than those who take notes assiduously word for word.

Banning computers may not be as big an issue as some in the teaching establishment might think. Clearly, such a move flies in the face of current pedagogical thinking of harnessing technology to in-class teaching practices. However, such practices are not always happening in ways that profit either the lecturer or student. The ability to enable or disable the Internet is one such control, though as stated earlier, bleed-through



from other networks and the proliferation of other wireless devices may make such a move moot. Some limitations on laptop use are likely to increase class attention and involvement levels but need to be coordinated with etiquette education so that students value and respect the appropriate use of technology.

Perhaps then, returning to the theme of digital citizenry and educating students in the art of when, where, and how to use technology in an appropriate fashion, without distracting, bothering, or annoying other students is where the focus should lie in the immediate future.

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## APPENDIX A: SURVEY QUESTIONS

The following survey relates only to your experiences in SILS. When responding please focus only on SILS courses and not courses taken in other colleges or departments.

This survey should take no more than 20 minutes to complete. You may skip a question or stop taking this survey at anytime if you so choose.

### **Section I – This section focuses on you and your laptop usage**

1. Do you own a laptop computer?

(Select one) Yes / No (if No, please go to Q.6)

2. How often do you take your laptop to class?

(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time) / Never (if Never please go to Q.6)

3. How often do you use your laptop in class?

(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time) / Never (if Never please go to Q.6)

4. Of the following activities, for which do you regularly use your laptop in class?

(Select all that apply) In-class work / Course website / Research / Information discovery / Note taking / Fact checking / Other class related tasks / None of these  
(If NONE go to Q.5)

4a. How often do you use your laptop for all those activities you selected Q.4 in your current classes?

(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time) / Never

4b. Excluding classes where laptops are required, approximately how much time per class do you spend on all the activities you selected in Q.4?

(Select one) 0% / <5% / 10-25% / 25-50% / 50-75% / >75%

5. During classes, do you use your laptop for any of the following?

(Select all that apply) Coursework for other classes not related to the one you are in / Email / Instant Messaging / Social networking (e.g. Facebook) / General web surfing / Online shopping / Crosswords / Scrabble / Other online games / Computer games (e.g. Solitaire) / Online Shopping / Other tasks / None of these (If NONE go to Q.6)

5a. Of those activities you selected in Q.5 please list the top *five* activities you engage in most frequently during class. (Order does not matter)

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
 4. \_\_\_\_\_ 5. \_\_\_\_\_

5b. How often do you use your laptop for any of the activities in your current classes listed in Q.5?

(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time) / Never

5c. Approximately how much time per class do you spend on the activities you selected in Q.5?

(Select one) 0% / <5% / 10-25% / 25-50% / 50-75% / >75%

5d. How often do you believe your activities distract other students from fully participating in class?

(Select one) Always / Most of the time (>50%) / Some of the time (<50%) / Never / Don't know

6. How many of your current SILS courses require you to bring a laptop to class?

(Select one) 0 / 1 / 2 / 3 / 4 / 5 / Don't know

6a. Of these courses, how often do you use your laptop for in-class activities?

(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time) / Never

6b. Of these courses, how much time do you spend using your laptop for class activities?

(Select one) 0% / <5% / 10-25% / 25-50% / 50-75% / >75%

7. Generally, do you believe limiting laptop usage would make you feel more or less involved with the class?

(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

8. Generally, do you believe limiting Internet access to course specific websites would make you feel more or less involved with the class?

(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

9. Generally, do you believe that banning laptops from the classroom would make you feel more or less involved with the class?

(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

10. Generally, do you believe limiting general laptop usage would make you feel more or less inclined to take an elective course?

(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

11. Generally, do you believe limiting Internet access to course specific websites would make you more or less inclined to take an elective course?

(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

12. Generally, do you believe banning laptops from the classroom would make you be more or less inclined to take an elective course?

(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

**Section II – This section focuses on your perceptions of other students in the classroom environment**

13. Do you notice other students' using their laptops in class?

(Select one) Yes / No (if No, please go to Q.15)

13a. What makes you notice another student's laptop usage in class?

(Select all that apply) Curiosity / Boredom with class / Rendering of website / Flashing IM prompt / Keyboard tapping / Computer sounds / Other / None of these

14. What types of activities do you notice students engaging in with respect to their class laptop usage?

(Select all that apply) Class work / Course website / Research / Information discovery / Note taking / Fact checking / Other class related tasks / Coursework for other classes / Email / Instant Messaging / Social networking (e.g. Facebook) / General web surfing / Online shopping / Crosswords / Scrabble / Other online games / Computer games (e.g. Solitaire) / Online Shopping / Other tasks / None of these (If NONE go to Q.15)

14a. Of those activities you selected in Q.14 please list the top *five* activities you believe other students engage in most frequently during class. (Order does not matter)

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
4. \_\_\_\_\_ 5. \_\_\_\_\_

15. Do you find laptop activity by other students in class bothersome, annoying or distracting?  
(Select one) Yes / No (if No, please go to Q.16)

15a. How often do you find such activity bothersome, annoying or distracting?  
(Select one) Every class / Most classes (>50% of the time) / Some classes (< 50% of the time)

15b. Does seeing another student using their laptop makes you more or less conscious of your own laptop usage in class:  
(Select one) Less conscious / Somewhat conscious / More conscious / Don't know

15c. Do you believe that seeing another student using their laptop makes you more or less likely to use your own laptop in-class?  
(Select one) Less likely / Somewhat likely / More likely / No change / Don't know

16. Generally, do you believe limiting laptop usage would make other students feel more or less involved with the class?  
(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

17. Generally, do you believe limiting Internet access to course specific websites would make other students feel more or less involved with the class?  
(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

18. Generally, do you believe that banning laptops from the classroom would make other students feel more or less involved with the class?  
(Select one) Less involved / Somewhat involved / More involved / Makes no difference / Don't know

19. Generally, do you believe limiting general laptop usage would make other students feel more or less inclined to take an elective course?  
(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

20. Generally, do you believe limiting internet access to course specific websites would make other students more or less inclined to take an elective course?

(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

21. Generally, do you believe banning laptops from the classroom would make other students more or less inclined to take an elective course?

(Select one) Less inclined / Somewhat inclined / More inclined / Makes no difference / Don't know

### **Section III – General background information**

22. Where did you complete this survey?

(Select one) In-class / SILS library or lab / On campus but not in SILS / At Home / Other

23. I am a(n):

☐ Undergraduate student  
☐ Graduate student

24. I am studying for a:

☐ BS Information Science  
☐ MS Information Science  
☐ MS Library Science

25. Please indicate which year of study you are currently taking:

☐ Freshman  
☐ Sophomore  
☐ Junior  
☐ Senior  
☐ Graduate Year 1  
☐ Graduate Year 2  
☐ Graduate Year 3+

26. Please indicate your gender:

☐ Female  
☐ Male  
☐ Prefer not to answer

27. Please indicate your age by checking one of the following:

- ☐ 18-21
- ☐ 22-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60+
- ☐ Prefer not to answer

28. Do you have any other comments you would like to add that you do not believe have been covered in this survey?

**I appreciate your participation and thank you helping with this study.**

**APPENDIX B: EMAIL TEXT CANVASSING STUDENT PARTICIPATION**

Subject: Invitation to participate in Master's paper survey on in-class laptop usage and student behavior.

**IRB Study #** 09-0083

**Consent Form Version Date:** 1/07/2009

**Study title:** Laptop usage with respect to in-class student user behavior

**Primary Investigator:** Martin Borbone (borbone@email.unc.edu, (617) 851-2470)

**Research Advisor:** Deborah Barreau (barreau@ils.unc.edu, (919) 966-5042 UNC School of Information and Library Science – Dept. 3701)

I am writing to request your participation in a research study, the purpose of which is to learn about potential effects of in-class laptop usage on both the user and students in the immediate vicinity. The study is aimed at all current undergraduate and graduate students in the School of Information and Library Sciences and your participation is greatly valued. The results of this study will form the basis of my master's paper.

Full details of the study can be found below together with answers to specific questions you might have, and your consent to participate. At the bottom of this email is a link to the survey. I appreciate your participation in this.

Thank you in advance for your time!

---

**What are some general things you should know about research studies?**

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study at any time, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You should ask the researcher named above, or staff members who may assist them, any questions you have about this study at any time.

**What is the purpose of this study?**

The purpose of this research study is to learn about potential effects of in-class laptop usage on both the user and students in the immediate vicinity

**Are there any reasons you should not be in this study?**

You should not participate in this study if you are not a current full or part-time student of the School of Information & Library Science.

**How many people will take part in this study?**

If you decide to participate, you will be one of approximately 300 people in this research study.

**How long will your part in this study last?**

The survey will take approximately 15-20 minutes to complete.

**What will happen if you take part in the study?**

You are asked to fill out an online survey gathering basic demographic information and information regarding your opinions and experiences as they relate to the study. All questions are voluntary and you do not have to answer any questions if you so choose.

**What are the possible benefits from being in this study?**

Research is designed to benefit society by gaining new knowledge. While you may not benefit personally from being in this research study your participation is important to help us understand how students perceive the use of laptops by other students within a classroom environment.

**What are the possible risks or discomforts involved from being in this study?**

There are no known risks or cause for discomfort in taking part in this study.

**How will your privacy be protected?**

Your name or other identifying information is not required for participation in this study. All IP (Internet Protocol) addresses will be removed from the data prior to its analysis. Participants *will not* be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.

The survey will be administered using the Qualtrics software system, which maintains data behind a firewall. All data are accessed only by the owner of the survey, who must provide password and user id. All pieces of data are keyed to that owner identification and cannot be accessed by anyone other than the owner or, by the owner's request, technical assistance staff. Technical assistance staff includes server administrators at Qualtrics who will respond to hardware or software failures, or Teresa Edwards, the UNC administrator for the Qualtrics Software Agreement. Ms. Edwards has completed Human Subjects Research certification at UNC-CH, and will only access survey data at the account owner's request.



**Will you receive anything for being in this study?**

You will not receive anything for taking part in this study.

**Will it cost you anything to be in this study?**

There will be no costs for being in the study

**What if you are a UNC student?**

You may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at UNC-Chapel Hill. You will not be offered or receive any special consideration if you take part in this research.

**What if you have questions about this study?**

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the primary researcher listed above.

**What if you have questions about your rights as a research participant?**

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to [IRB\\_subjects@unc.edu](mailto:IRB_subjects@unc.edu).

**Thank you for helping me with this study.**

---

**Participant's Agreement:**

I have read the information provided above. I have asked all the questions I have at this time. By continuing with the following web survey, I voluntarily agree to participate in this research study.

Click here to signify your consent to participate and take the survey  
[http://uncodum.qualtrics.com/SE/?SID=SV\\_3ltgBL6Xkj2mMy8&SVID=Prod](http://uncodum.qualtrics.com/SE/?SID=SV_3ltgBL6Xkj2mMy8&SVID=Prod)

## **APPENDIX C: REMINDER EMAIL TEXT CANVASSING STUDENT PARTICIPATION**

Subject: REMINDER: Invitation to participate in Master's paper survey on in-class laptop usage and student behavior.

I recently canvassed SILS students to participate in a research study I am conducting for my master's paper and would like to thank all of you who have responded so far and to remind others yet to respond that there is still an opportunity for you to participate. The survey will remain available until midnight Friday 13<sup>th</sup> February, 2009, and I would be grateful to you for finding the time to help me with this important research.

Just as a reminder, the purpose of the research study is to learn about potential effects of in-class laptop usage on both the user and students in the immediate vicinity. The study is aimed at all current undergraduate and graduate students in the School of Information and Library Sciences and your participation is greatly valued. The results of this study will form the basis of my master's paper.

Full details of the study can be found below together with answers to specific questions you might have, and your consent to participate. I appreciate your participation in this.

Thank you to all those who have responded so far and to others who respond in the next three days!

**IRB Study #** 09-0083

**Consent Form Version Date:** 1/07/2009

**Study title:** Laptop usage with respect to in-class student user behavior

**Primary Investigator:** Martin Borbone ([borbone@email.unc.edu](mailto:borbone@email.unc.edu), (617) 851-2470)

**Research Advisor:** Deborah Barreau ([barreau@ils.unc.edu](mailto:barreau@ils.unc.edu), (919) 966-5042 UNC School of Information and Library Science – Dept. 3701)

### **What are some general things you should know about research studies?**

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study at any time, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You should ask the researcher named above, or staff members who may assist them, any questions you have about this study at any time.

**What is the purpose of this study?**

The purpose of this research study is to learn about potential effects of in-class laptop usage on both the user and students in the immediate vicinity

**Are there any reasons you should not be in this study?**

You should not participate in this study if you are not a current full or part-time student of the School of Information & Library Science.

**How many people will take part in this study?**

If you decide to participate, you will be one of approximately 300 people in this research study.

**How long will your part in this study last?**

The survey will take approximately 15-20 minutes to complete.

**What will happen if you take part in the study?**

You are asked to fill out an online survey gathering basic demographic information and information regarding your opinions and experiences as they relate to the study. All questions are voluntary and you do not have to answer any questions if you so choose.

**What are the possible benefits from being in this study?**

Research is designed to benefit society by gaining new knowledge. While you may not benefit personally from being in this research study your participation is important to help us understand how students perceive the use of laptops by other students within a classroom environment.

**What are the possible risks or discomforts involved from being in this study?**

There are no known risks or cause for discomfort in taking part in this study.

**How will your privacy be protected?**

Your name or other identifying information is not required for participation in this study. All IP (Internet Protocol) addresses will be removed from the data prior to its analysis. Participants *will not* be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.

The survey will be administered using the Qualtrics software system, which maintains data behind a firewall. All data are accessed only by the owner of the survey, who must provide password and user id. All pieces of data are keyed to that owner identification and cannot be accessed by anyone other than the owner or, by the owner's request, technical assistance staff. Technical assistance staff includes server administrators at Qualtrics who will respond to hardware or software failures, or Teresa Edwards, the UNC administrator for the Qualtrics

Software Agreement. Ms. Edwards has completed Human Subjects Research certification at UNC-CH, and will only access survey data at the account owner's request.

**Will you receive anything for being in this study?**

You will not receive anything for taking part in this study.

**Will it cost you anything to be in this study?**

There will be no costs for being in the study

**What if you are a UNC student?**

You may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at UNC-Chapel Hill. You will not be offered or receive any special consideration if you take part in this research.

**What if you have questions about this study?**

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the primary researcher listed above.

**What if you have questions about your rights as a research participant?**

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB\_subjects@unc.edu.

**Thank you for helping me with this study.**

---

**Participant's Agreement:**

I have read the information provided above. I have asked all the questions I have at this time. By continuing with the following web survey, I voluntarily agree to participate in this research study.

Click here to signify your consent to participate and take the survey  
[http://uncodum.qualtrics.com/SE/?SID=SV\\_3ltgBL6Xkj2mMy8&SVID=Prod](http://uncodum.qualtrics.com/SE/?SID=SV_3ltgBL6Xkj2mMy8&SVID=Prod)

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Carole and Mervyn Barnes, my parents, your unconditional love and support is a constant. You reassure me when I doubt myself and encourage me to be a better person. Your love is the reason I have achieved so much. I am honored and proud to be your son.

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Randy Walther, my partner, whose love, inspiration, and companionship remain a constant source of comfort and strength in good times and bad, who opened my eyes to the infinite possibilities that life has to offer and in the process taught me so much.

I am indebted to you all and dedicate this paper to each of you in grateful recognition and appreciation of your support, counsel, wisdom, and above all love.

Thank you. MB